Hamilton Home Products, Inc.

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INSTALLATION AND SERVICE MANUAL
gas-fired unit heaters
model WGH

All models approved for use in California by the CEC, in New York city by the MEA division, and in Massachusetts. Unit heater is certified for residential and commercial applications.

⚠ WARNING

1. Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death, and could cause exposure to substances which have been determined by various state agencies to cause cancer, birth defects or other reproductive harm. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.

2. Do not locate ANY gas-fired units in areas where chlorinated, halogenated, or acid vapors are present in the atmosphere. These substances can cause premature heat exchanger failure due to corrosion, which can cause property damage, serious injury, or death.

FOR YOUR SAFETY

WHAT TO DO IF YOU SMELL GAS:

1. Open windows.
2. Do not try to light any appliance.
3. Do not touch any electrical switch; do not use any phone in your building.
4. Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions. If you can not reach your gas supplier, call your fire department.

FOR YOUR SAFETY

The use and storage of gasoline or other flammable vapors and liquids in open containers in the vicinity of this appliance is hazardous.

IMPORTANT

The use of this manual is specifically intended for a qualified installation and service agency. All installation and service of these units must be performed by a qualified installation and service agency.

Inspection on Arrival

1. Inspect unit upon arrival.
2. Check rating plate on unit to verify that power supply meets available electric power at the point of installation.
3. Inspect unit upon arrival for conformance with description of product ordered (including specifications where applicable). **For technical assistance and Warranty Administratrion, contact Hamilton Home Products at 1.800.879.0123. Do not return equipment to the home center.**

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THIS MANUAL IS THE PROPERTY OF THE OWNER.
PLEASE BE SURE TO LEAVE IT WITH THE OWNER WHEN YOU LEAVE THE JOB.

SPECIAL PRECAUTIONS

SPECIAL PRECAUTIONS

THE INSTALLATION AND MAINTENANCE INSTRUCTIONS IN THIS MANUAL MUST BE FOLLOWED TO PROVIDE SAFE, EFFICIENT AND TROUBLE-FREE OPERATION. IN ADDITION, PARTICULAR CARE MUST BE EXERCISED REGARDING THE SPECIAL PRECAUTIONS LISTED BELOW. FAILURE TO PROPERLY ADDRESS THESE CRITICAL AREAS COULD RESULT IN PROPERTY DAMAGE OR LOSS, PERSONAL INJURY, OR DEATH. THESE INSTRUCTIONS SUBJECT TO ANY MORE RESTRICTIVE LOCAL OR NATIONAL CODES.

HAZARD INTENSITY LEVELS

1. **DANGER:** Indicates an imminently hazardous situation which, if not avoided, WILL result in death or serious injury.
2. **WARNING:** Indicates a potentially hazardous situation which, if not avoided, COULD result in death or serious injury.
3. **CAUTION:** Indicates a potentially hazardous situation which, if not avoided, MAY result in minor or moderate injury.
4. **IMPORTANT:** Indicates a situation which, if not avoided, MAY result in a potential safety concern.

⚠ DANGER

Appliances must not be installed where they may be exposed to a potentially explosive or flammable atmosphere.

⚠ WARNING

1. Gas fired heating equipment must be vented - do not operate unvented.
2. A built-in power exhauster is provided - additional external power exhausters are not required or permitted.
3. If you are replacing an existing heater, it may be necessary to resize the venting systems. Improperly sized venting systems can result in vent gas leakage or the formation of condensate. Refer to the National Fuel Gas Code ANSI Z223.1 or CSA B149.1 latest edition. Failure to follow these instructions can result in injury or death.
4. Under no circumstances should two sections of double wall vent pipe be joined together within one horizontal vent system due to the inability to verify complete seal of inner pipes.
5. All field gas piping must be pressure/leak tested prior to operation. Never use an open flame. Use a soap solution or equivalent for testing.
6. Gas pressure to appliance controls must never exceed 14" W.C. (1/2 psi).
7. To reduce the opportunity for condensation, the minimum sea level input to the appliance, as indicated on the serial plate, must not be less than 5% below the rated input, or 5% below the minimum rated input of dual rated units.
8. Disconnect power supply before making wiring connections to prevent electrical shock and equipment damage.
9. All appliances must be wired strictly in accordance with wiring diagram furnished with the appliance. Any wiring different from the wiring diagram could result in a hazard to persons and property.
10. Any original factory wiring that requires replacement must be replaced with wiring material having a temperature rating of at least 105°C.
11. Ensure that the supply voltage to the appliance, as indicated on the serial plate, is not 5% greater than the rated voltage.
12. When servicing or repairing this equipment, use only factory-approved service replacement parts. A complete replacements parts list may be obtained by contacting the factory. Refer to the rating plate on the appliance for complete appliance model number, serial number, and company address. Any substitution of parts or controls not approved by the factory will be at the owners risk.

⚠ CAUTION

1. All literature shipped with this unit should be kept for future use for servicing or service diagnostics. Do not discard any literature shipped with this unit.
2. Consult piping, electrical, and venting instructions in this manual before final installation.
3. Do not attach ductwork, air filters, or polytubes to any propeller unit heater.
4. Clearances to combustible materials are critical. Be sure to follow all listed requirements.
5. Do not locate units in tightly sealed rooms or small compartments (commonly referred to as confined spaces) without provisions for adequate combustion air and venting. Combustion air must have access to the confined space through a minimum of two permanent openings in the enclosure, at least one near the bottom. They should provide a free area of one square inch per 1,000 BTU/Hr input rating of the unit with a minimum of 100 square inches for each opening, whichever is greater.
6. Low profile heaters are designed for use in heating. applications with ambient temperatures between -40°F and 90°F.
7. Do not install unit outdoors.
8. In garages or other sections of aircraft hangars such as offices and shops that communicate with areas used for servicing or storage, keep the bottom of the unit at least 7' above the floor unless the unit is properly guarded to provide user protection from moving parts. In parking garages, the unit must be installed in accordance with the standard for parking structures ANSI/NFPA 88A, and in repair garages the standard for repair garages NFPA #88B. In Canada, installation of heaters in airplane hangars must be in accordance with the requirements of the enforcing authority, and in public garages in accordance with the current CSA-B149 codes.
9. In aircraft hangars, keep the bottom of the unit at least 10' from the highest surface of the wings or engine enclosure of the highest aircraft housed in the hangars and in accordance with the requirements of the enforcing authority and/or NFPA 409-latest edition.
10. Installation of units in high humidity or salt water atmospheres will cause accelerated corrosion resulting in a reduction of the normal life of the units.
11. Do not install units below 7' measured from the bottom of the unit to the floor in commercial applications (unless unit is properly guarded to provide user protection from moving parts)and 5' measured from the bottom of the unit to the floor in residential applications.
12. Be sure no obstructions block air intake and discharge of unit heaters.
13. The minimum distance from combustible material is based on the combustible material surface not exceeding 160°F. Clearance from the top of the unit may be required to be greater then the minimum specified if heat damage, other than fire, may occur to materials above the unit heater at the temperature described.
14. Allow 18" of clearance at rear (or 6" beyond end of motor at rear of unit, whichever is greater) and access side to provide ample air for combustion and proper operation of fan.
15. Installation must conform with local building codes or in the absence of local codes, with Part 7, Venting of Equipment, of the National Fuel Gas Code, ANSI Z223.1 (NFPA 54) - latest edition. In Canada installation must be in accordance with CSA-B149.1.
16. Purging of air from gas supply line should be performed as described in ANSI Z223.1 - latest edition “National Fuel Gas Code”, or in Canada in CSA-B149 codes.

SPECIAL PRECAUTIONS / SI (METRIC) CONVERSION FACTORS

⚠ CAUTION

17. When leak testing the gas supply piping system, the appliance and its combination gas control must be isolated during any pressure testing in excess of 14" W.C. (1/2 psi).
18. The unit should be isolated from the gas supply piping system by closing its field installed manual shut-off valve. This manual shut-off valve should be located within 6' of the heater.
19. Turn off all gas before installing appliance.
20. Ensure that the supply voltage to the appliance, as indicated on the serial plate, is not 5% less than the rated voltage.
21. Check the gas inlet pressure at the unit upstream of the combination gas control. The inlet pressure should be 6-7" W.C. on natural gas or 12-14" W.C. on propane. If inlet pressure is too high, install an additional pressure regulator upstream of the combination gas control.
22. Servicing or repairing of this equipment must be performed by a qualified service agency.
23. Do not attempt to reuse any mechanical or electronic ignition controllers which has been wet. Replace defective controller.

IMPORTANT

1. To prevent premature heat exchanger failure, do not locate ANY gas-fired appliances in areas where corrosive vapors (i.e. chlorinated, halogenated or acid) are present in the atmosphere.
2. To prevent premature heat exchanger failure, the input to the appliance as indicated on the serial plate, must not exceed the rated input by more then 5%.
3. To check most of the Possible Remedies in the trouble-shooting guide listed in Table 21.1 refer to the applicable sections of the manual.

SI (METRIC) CONVERSION FACTORS

To Convert	Multiply By	To Obtain
"W.C.	0.249	kPa
°F	(°F-32) x 5/9	°C
Btu	1.06	kJ
Btu/ft^3	37.3	kJ/m^3
Btu/hr	0.000293	kW
CFH (ft^3/hr)	0.000472	m^3/min
CFH (ft^3/hr)	0.00000787	m^3/s
CFM (ft^3/min)	0.0283	m^3/min
CFM (ft^3/min)	0.000472	m^3/s

To Convert	Multiply By	To Obtain
feet	0.305	m
Gal/Hr.	0.00379	m^3/hr
Gal/Hr.	3.79	l/hr
gallons	3.79	l
Horsepower	746	W
inches	25.4	mm
pound	0.454	kg
psig	6.89	kPa
psig	27.7	"W.C.

BEFORE YOU BEGIN

⚠ CAUTION

1. All literature shipped with this unit should be kept for future use for servicing or service diagnostics. Leave manual with the owner. Do not discard any literature shipped with this unit.
2. Consult piping, electrical, and venting instructions in this manual before final installation.
3. Do not attach ductwork, air filters, or polytubes to any propeller unit heater.

In the U.S., the installation of these units must comply with the “National Fuel Gas Code,” ANSI Z223.1, latest edition (also known as NFPA 54) and other applicable local building codes. In Canada, the installation of these units must comply with local plumbing or waste water codes and other applicable codes and with the current code CSA-B149.1.

1. All installation and service of these units must be performed by a qualified installation and service agency only as defined in ANSI Z223.1, latest edition or in Canada by a licensed gas fitter.
2. This unit is certified with the controls furnished. For replacements parts, please order according to the replacement parts list on serial plate. Always know your model and serial numbers. The right is reserved to substitute other authorized controls as replacements.
3. Unit is balanced for correct performance. Do not alter fan or operate motors at reduced speed.
4. Information on controls is supplied separately.
5. The same burner is used for natural and propane gas.

UNIT LOCATION

⚠ DANGER

Appliances must not be installed where they may be exposed to a potentially explosive or flammable atmosphere.

⚠ CAUTION

1. Clearances to combustible materials are critical. Be sure to follow all listed requirements.
2. Do not locate units in tightly sealed rooms or small compartments (commonly referred to as confined spaces) without provisions for adequate combustion air and venting. Combustion air must have access to the confined space through a minimum of two permanent openings in the enclosure, at least one near the bottom. They should provide a free area of one square inch per 1,000 BTU/Hr input rating of the unit with a minimum of 100 square inches for each opening, whichever is greater.
3. Low profile heaters are designed for use in heating applications with ambient temperatures between -40°F and 90°F.
4. Do not install unit outdoors.
5. In garages or other sections of aircraft hangars such as offices and shops that communicate with areas used for servicing or storage, keep the bottom of the unit at least 7' above the floor unless the unit is properly guarded. In parking garages, the unit must be installed in accordance with the standard for parking structures ANSI/NFPA 88A, and in repair garages the standard for repair garages NFPA #88B. In Canada, installation of heaters in airplane hangars must be in accordance with the requirements of the enforcing authority, and in public garages in accordance with the current CSA-B149 codes.
6. In aircraft hangars, keep the bottom of the unit at least 10' from the highest surface of the wings or engine enclosure of the highest aircraft housed in the hangars and in accordance with the requirements of the enforcing authority and/or NFPA 409-latest edition.
7. Installation of units in high humidity or salt water atmospheres will cause accelerated corrosion resulting in a reduction of the normal life of the units.

IMPORTANT

To prevent premature heat exchanger failure, do not locate ANY gas-fired appliances in areas where corrosive vapors (i.e. chlorinated, halogenated or acid) are present in the atmosphere.

Location Recommendations

1. When locating the heater, consider general space and heating requirements, availability of gas and electrical supply, and proximity to vent locations.
2. When locating units, it is important to consider that the exhaust vent piping must be connected to the outside atmosphere.
3. Be sure the structural support at the unit location site is adequate to support the unit's weight. For proper operation the unit must be installed in a level horizontal position.
4. Do not install units in locations where the flue products can be drawn into the adjacent building openings such as windows, fresh air intakes, etc.
5. Be sure that the minimum clearances to combustible materials and recommended service clearances are maintained. Units are designed for installation with the minimum clearances as shown in Table 4.1.

Table 4.1 Clearances

Unit Side	Clearance To Combustible Materials	Recommended Service Clearance
Top and Bottom	1"	1"
Access Side	18"	18"
Non-Access Side	1"	1"
Rear	18"	18"
Vent Connector	4"	4"

6. Do not install units in locations where gas ignition system is exposed to water spray, rain, or dripping water.
7. Mounting Height (measured from bottom of unit) at which unit heaters are installed is critical. Refer to mounting height and heat throw data on page 19 of this manual. The maximum mounting height for any unit is that height above which the unit will not deliver heated air to the floor.

Combustion Air Requirements

The National Fuel Gas Code defines an “unconfined space” as a space whose volume is greater than 50 cubic feet per 1,000 Btu/Hr input of the installed appliance(s). A confined space is 50 cubic feet or less per 1,000 Btu/Hr input of the installed appliance(s).

It is not recommended to install these unit heaters into residential confined spaces. This recommendation is due to the concern that at some point in time, the combustion air openings provided by the installer may become blocked or eliminated by the owner, either intentionally or unintentionally. Despite this commendation, if these units are installed into a residential confined space, see National Fuel Gas Code ANSI Z223.1 or CSA B149.1 Installation Code, latest edition, for detailed combustion air provisions. These requirements must be adhered too.

Units installed into confined spaces in industrial/commercial installations must be provided with two permanent openings - one near the top and one near the bottom of the confined space. Each opening should have a free area of not less than one square inch per 1,000 Btu/Hr of the total input rating of all units in the confined space, freely communicating with interior areas having, in turn, adequate infiltration from the outside.

For further details on supplying combustion or to a confined (tightly sealed) space or unconfined space, see the National Fuel Gas Code ANSI Z223.1 or CSA B149.1 Installation Code, latest edition.

Turning The Unit

All units are produced at the factory with left-side controls (when looking at the unit). If the installation requires the controls to be on the right side, all heaters can be turned-over by following the instructions below.

- By turning the unit 180° from the way it was received from the factory, the sides become opposite but the front and back remain in the same relative position. The bottom panel now becomes the top panel and vice-versa.
- Remove the access panel, turn it 180°, and re-attach it to the unit so that all the information labels can be read.
- Remove the spring loaded deflector blades, turn them over, replace, and adjust so they are open and in a position to direct the heated air down to the floor.

UNIT MOUNTING

⚠ CAUTION

1. Do not install units below 7' measured from the bottom of the unit to the floor in commercial applications (unless unit is properly guarded to provide user protection from moving parts) and 5' measured from the bottom of the unit to the floor in residential applications.
2. Be sure no obstructions block air intake and discharge of unit heaters.
3. The minimum distance from combustible material is based on the combustible material surface not exceeding 160°F. Clearance from the top of the unit may be required to be greater than the minimum specified if heat damage, other than fire, may occur to materials above the unit heater at the temperature described.
4. Allow 18" clearance at rear (or 6" beyond end of motor at rear of unit, whichever is greater) and access side to provide ample air for combustion and proper operation of fan.

1. Be sure the means of suspension is adequate to support the weight of the unit (see page 19 for unit weights).
2. For proper operation, the unit must be installed in a level horizontal position.
3. Clearances to combustibles as previously specified must be strictly maintained.
4. Before lifting the heater for suspension, the mounting brackets must be installed as follows:
   - For standard (left side) control access, remove the (3) screws and mounting bracket along the top edge of both the front and back of the unit. Install the front bracket as shown in Figure 5.1 by aligning the screw holes on the bracket with the screw holes on the top edge of the unit. Repeat for the bracket on the back of the unit.
   - For right side control access, remove the (3) screws and mounting bracket along the top edge of both the front and back of the unit. Turn the unit over and install the front bracket as shown in Figure 5.2 by aligning the screw holes on the bracket with the screw holes on the top edge of the unit (originally the bottom edge). Repeat for the bracket on the back of the unit.

Figure 5.1
Unit Heater in Standard Mounting Configuration

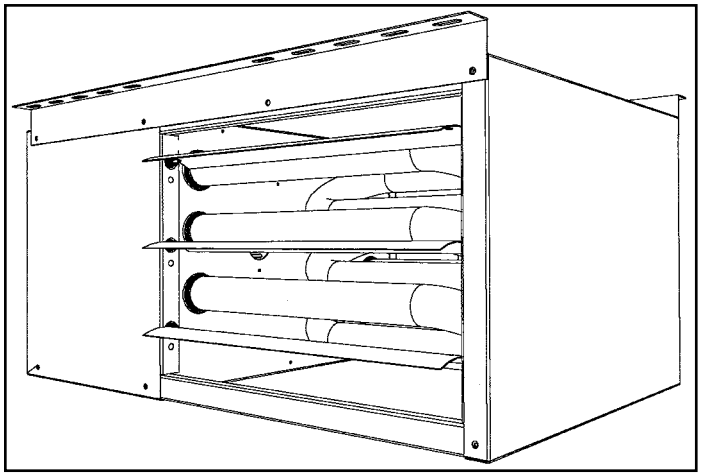
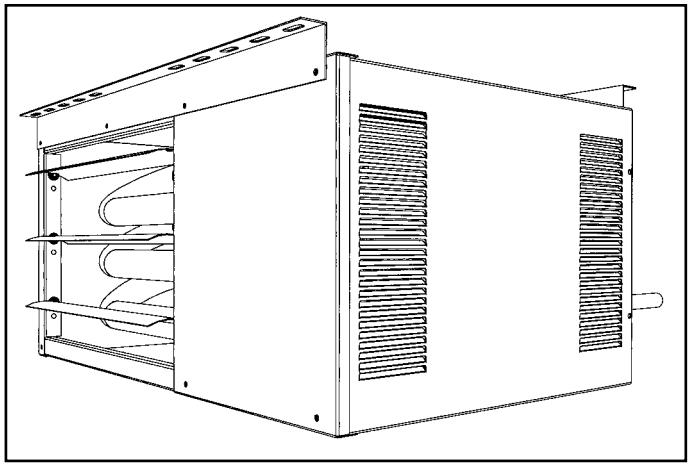


Figure 5.2
Unit Heater Turned 180°
(Access panel and heated air outlet change sides)



5a. **Suspension by screws/lag bolts:** Secure the mounting brackets to the ceiling joists or truss, using 1/4" screws with 1/2" washers. These unit mounting brackets are slotted to accommodate joists on 16" or 24" centerlines.

5b. **Suspension by threaded rod:** The unit can also be hung with threaded rod utilizing the same mounting brackets. Attach the threaded rod to the unit mounting brackets, securing with a top and bottom nut.

Next, drill holes into a steel channel or angle iron at the same centerline dimensions as those chosen for the heater being installed. The steel channels or angle iron pieces need to span and be fastened to appropriate structural members. Cut the threaded rods to the preferred length, push them through the holes in the steel channel or angle iron and secure with washers and lock nuts, lock washers and nuts, or a double nut arrangement.

5c. **Shelf mounted units:** The unit heater can also be installed on a shelf. The mounting brackets will need to be attached to the heater the same manner as explained in note #4, however, to mount on a shelf the brackets must go on the bottom of the heater. The brackets must be affixed to the shelf using similar screws (1/4" screw with 1/2" washer) as overhead joist or truss mounting. Be sure all clearance to combustible requirements are met.

INSTALLATION - VENTING

⚠ WARNING

1. Gas fired heating equipment must be vented - do not operate unvented.
2. A built-in power exhauster is provided - additional external power exhausters are not required or permitted.
3. If you are replacing an existing heater, it may be necessary to resize the venting systems. Improperly sized venting systems can result in vent gas leakage or the formation of condensate. Refer to the National Fuel Gas Code ANSI Z223.1 or CSA B149.1 latest edition. Failure to follow these instructions can result in serious injury or death.
4. Under no circumstances should two sections of double wall vent pipe be joined together within one horizontal vent system due to the inability to verify complete seal of inner pipes.

⚠ CAUTION

Installation must conform with local building codes or in the absence of local codes, with Part 7, Venting of Equipment, of the National Fuel Gas Code, ANSI Z223.1 (NFPA 54) - latest edition. In Canada installation must be in accordance with CSA B149.1.

Model WGH unit heaters must be vented with the proper passageway as described in these instructions to convey flue gases from the unit or the vent connector to the outside atmosphere.

The venting instructions are organized in sections, based on installation type. The sections are identified as follows:

Instructions Section	Applicable Installation Instructions by Vent System Type
A	General instructions for **ALL** installations
B	**VERTICAL** vent systems ①
C	**HORIZONTAL Category III** vent systems ①
D	**HORIZONTAL Category I** vent systems ①

① The differences between Vertical, Horizontal Category III, and Horizontal Category I will be identified in "Section A - General Instructions – All Units".

Section A – General Instructions – All Units

A1. If the unit heater being installed is replacing existing equipment and using the existing vent system from that equipment, inspect the venting system for proper size and horizontal pitch, as required in the National Fuel Gas Code ANSI Z223.1 or CSA B149.1 Installation Code-latest edition and these instructions. Determine that there is no blockage or restriction, leakage, corrosion and other deficiencies, which could cause an unsafe condition.

A2. The vent pipe should be galvanized steel or other suitable corrosion resistant material (except for Horizontal Category III vent systems, which will be covered in "Section C – Horizontal, Category III Vent System Installation"). Follow the National Fuel Gas Code for minimum thickness of vent material. The minimum thickness for connectors varies depending on the pipe diameter. Do not vent unit with PVC or other forms of plastic venting material.

A3. All heaters come with a factory installed vent adapter for attaching the vent pipe to the heater (3" for model sizes 30-75). Attach the vent pipe to the adapter with 3 non-corrosive screws. (Drill pilot holes through the vent pipe and adapter prior to screwing in place).

A4. A minimum of 12" straight pipe is recommended from the flue outlet before turns in the vent pipe.

A5. Horizontal sections of vent pipe are to be installed with a minimum downward slope from the appliance of 1/4 inch per foot and suspended securely from overhead structures at points not greater than 3' apart.

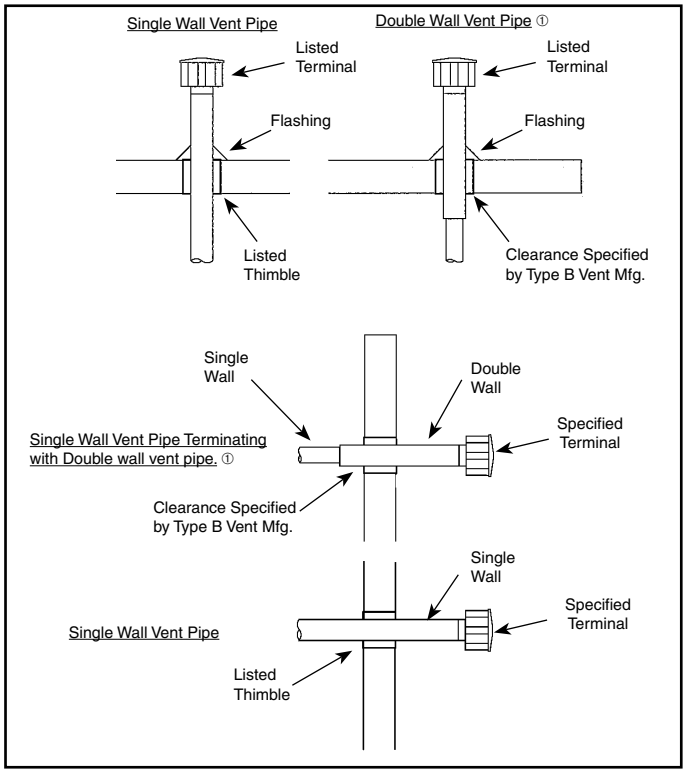
A6. Fasten individual lengths of vent together with at least three corrosion resistant sheet metal screws.

A7. Keep single wall vent pipe at least 6" from combustible materials. For double wall vent pipe, follow the vent pipe manufacturer's clearances to combustibles. The minimum distance from combustible materials is based on the combustible material surface not exceeding 160°F. Clearance from the vent pipe (or the top of the unit) may be required to be greater than 6" if heat damage other than fire could result (such as material distortion or discoloration).

A8. Avoid venting through unheated space when possible. When venting does pass through an unheated space or if the unit is installed in an environment that promotes condensation, insulate runs greater than 5' to minimize condensation. Inspect for leakage prior to insulating and use insulation that is noncombustible with a rating of not less than 400°F. Install a tee fitting at the low point of the vent system and provide a drip leg with a clean out cap as shown in Figure 8.1.

A9. When the vent passes through a combustible INTERIOR wall or floor, a metal thimble 4" greater than the vent diameter is necessary. If there is 6' or more of vent pipe in the open space between the appliance and where the vent pipe passes through the wall or floor, the thimble need only be 2" greater than the diameter of the vent pipe. If a thimble is not used, all combustible material must be cut away to provide 6" of clearance. Where authorities have jurisdiction type B vent may be used for the last section of vent pipe to maintain clearance to combustibles while passing through wall or floor. See Figure 6.1. Any material used to close the opening must be noncombustible.

Figure 6.1
Venting Through Combustible Roof or Wall



① See Instruction A10 for attaching single wall pipe to double wall pipe

INSTALLATION - VENTING

A10. The following are General Instructions for Double Wall (Type B) Terminal Pipe Installation:

How to attach a single wall vent terminal to double wall (type B) vent pipe:

1. Look for the “flow” arrow on the vent pipe.
2. Slide the vent terminal inside the exhaust end of the double wall vent pipe.
3. Drill (3) holes through the pipe and the vent terminal. Using 3/4" long sheet metal screws, attach the cap to the pipe. Do not over tighten.

How to connect a single wall vent system to a double wall (type B) vent pipe:

1. Slide the single wall pipe inside the inner wall of the double wall pipe.
2. Drill (3) holes through both walls of the single and double wall vent pipes. Using 3/4" sheet metal screws, attach the two pieces of pipe. Do not over tighten.
3. The gap between the single and double wall pipe must be sealed but it is not necessary to fill the full volume of the annular area. To seal, run a large bead of 400°F silastic around the gap.

A11. Vent termination clearances must be maintained:

Table 7.1 - Vent Termination Clearances

Structure	Minimum Clearances for Vent Terminal Location
Forced air inlet within 10 feet	3 feet above
Combustion air inlet of another appliance	6 feet all directions
Door, window, gravity air inlet, or any building opening	4 feet horizontal and below 1 foot above
Electric meter, gas meter, gas regulator, and relief equipment ①	4 feet horizontal (U.S.) 6 feet horizontal (Canada)
Gas regulator ①	3 feet horizontal (U.S.) 6 feet horizontal (Canada)
Adjoining building or parapet wall	6 feet all directions
Adjacent public walkways	7 feet all directions
Grade (ground level)	3 feet above ②

① Do not terminate the vent directly above a gas meter or regulator.

② The vent must be at least 6" higher than anticipated snow depth.

A12. Do NOT use dampers or other devices in the vent or combustion air pipes.

A13. Precautions must be taken to prevent degradation of building materials by flue products.

A14. Single wall vent pipe must not pass through any unoccupied attic, inside wall, concealed space, or floor.

A15. Uninsulated single wall vent pipe must not be used outdoors for venting appliances in regions where the 99% winter design temperature is below 32°F.

A16. In addition to following these General Instructions, specific instructions for Vertical, Horizontal Category III, or Horizontal Category I vent systems must also be followed. Table 7.2 outlines the differences:

Table 7.2 - ANSI Unit Heater Venting Requirements

Category	Description	Venting Requirements
I	Negative vent pressure Non-condensing	Follow standard venting requirements.
II	Negative vent pressure Condensing	Condensate must be drained.
III	Positive vent pressure Non-condensing	Vent must be gas tight.
IV	Positive vent pressure Condensing	Vent must be liquid and gastight. Condensate must be drained.

Note: Vent connectors serving Category I appliances shall not be connected into any portion of mechanical draft systems operating under positive pressure.

Vertical Category I Vent System Determination

- Vertical vent systems terminate vertically (up).
- The horizontal portion of the vent run cannot exceed 75% of the vertical rise (Example: If the vent height is 10 feet, the horizontal portion of the vent system cannot exceed 7.5 feet).
- The vent terminates a minimum of 5’ above the vent connector on the unit.
- If the vent system to be installed meets ALL these criteria (an example is shown in Figure 9.1), proceed to “Section B – Vertical Vent System Installation”. For all other cases, proceed to the next section to determine if the installation is Horizontal Category I or Horizontal Category III.

Horizontal Category I/III Vent System Determination

- Horizontal vent systems terminate horizontally (sideways).
- A vent system that terminates vertically but has a horizontal run that exceeds 75% of the vertical rise is considered horizontal.

Most horizontal vent configurations are Category III. For residential installations, this requires the use of an agency approved (UL1728) Category III stainless steel vent system. Additional requirements, including those for commercial and industrial installations are covered in “Section C – Horizontal, Category III Vent System Installation”.

If the application is residential and specific vent dimensions and termination limitations are followed, the use of a less expensive Category I vent system may be used. These limitations are summarized in Table 7.3.

Table 7.3 Horizontal Category I Vent System Limitations

Model Size	Vent Terminal	Maximum No. of Elbows	Minimum Vertical Rise From Horizontal (in)	Maximum Horizontal Vent Length (ft)	Vent Diameter (in)
30	TEE	1	0	10	5
	TEE	1	0	5	4
	Cap	2 ①	4 ②	10	5
	Cap	2 ①	12 ②	5	4
	Cap	2 ①	18 ②	10	4
45	TEE	1	0	10	5
	Cap	2 ①	12 ②	10	5
	Cap	2 ①	18 ②	5	4
60	TEE	1	0	10	5
	Cap	2 ①	15 ②	10	5
75	TEE	1	0	5	5
	Cap	2 ①	18 ②	5	5

① One of the two allowed elbows is required to create the vent extension shown in figures 12.3 and 12.4.

② The vertical rise gained from an elbow is 4". Therefore, 4" may be subtracted from the length of vertical pipe needed in the vent extension. If the minimum vertical rise required is 4" you do not need to add a section of vertical pipe to the vent extension.

If the conditions noted above for horizontal Category I venting exist, instructions in “Section D – Horizontal, Category I Vent System Installation” can be followed. Otherwise, proceed to “Section C – Horizontal, Category III Vent System Installation”.

INSTALLATION - VENTING

Section B – Vertical Vent System Installation

B1. This section applies to vertically vented Category I vent systems and is in addition to "Section A – General Instructions – All Units".

B2. Vertical vent systems terminate vertically.

B3. The horizontal portion of the vent run cannot exceed 75% of the vertical rise (Example: If the vent height is 10 feet, the horizontal portion of the vent system cannot exceed 7.5 feet).

B4. It is recommended to install a tee with drip leg and clean out cap as shown in Figure 8.1.

B5. The vent terminates a minimum of 5' above the vent connector on the unit.

B6. All vertically vented heaters that are Category I must be connected to a chimney or vent complying with a recognized standard, or a lined masonry (or concrete) chimney with a material acceptable to the authority having jurisdiction. Venting into an unlined masonry chimney is not permitted. Refer to the National Fuel Gas Code for common venting and pages 13-14 of this manual.

B7. Use a listed vent terminal to reduce down drafts and moisture in the vent.

B8. Double wall vent pipe is recommended, although single wall can be used if the requirements of the National Fuel Gas Code are followed.

B9. Vertical vents must terminate a minimum horizontal and vertical distance from roof lines and adjacent walls or obstructions. These minimum distances are outlined as follows (based on National Fuel Gas Code requirements for vents with diameters less than 12"):

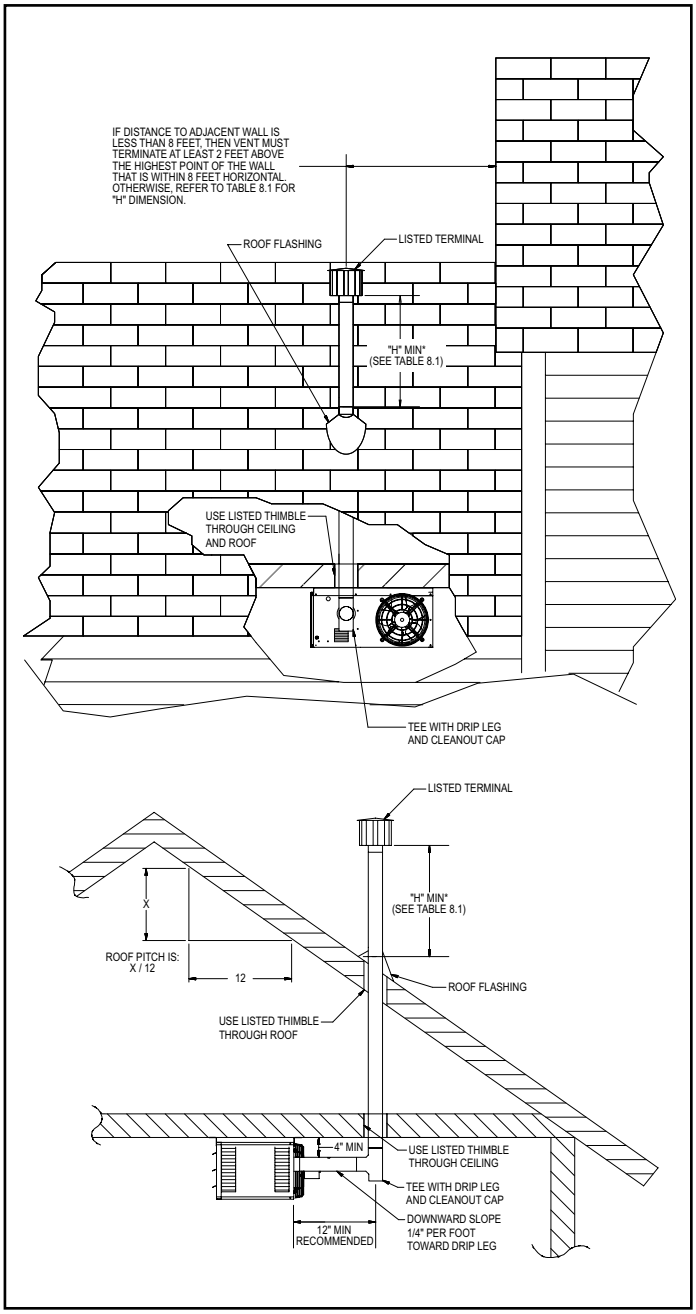
- For **double wall** vent pipe and **8' or greater** horizontal distance to any vertical wall or similar obstruction, the vent must terminate above the roof in accordance with Figure 8.1 and Table 8.1.
- For **double wall** vent pipe and **less than 8'** horizontal distance to any vertical wall or similar obstruction, the vent must terminate at least 2' above the highest point where it passes through a roof of a building and at least 2' higher than any portion of a building within a horizontal distance of 10'. See Figure 8.1.

Table 8.1 - Minimum Height from Roof to Lowest Discharge Opening

Rise X (in)	Roof Pitch	Min Height H (ft) ①
0-6	Flat to 6/12	1.00
6-7	6/12 to 7/12	1.25
7-8	7/12 to 8/12	1.50
8-9	8/12 to 9/12	2.00
9-10	9/12 to 10/12	2.50
10-11	10/12 to 11/12	3.25
11-12	11/12 to 12/12	4.00
12-14	12/12 to 14/12	5.00
14-16	14/12 to 16/12	6.00
16-18	16/12 to 18/12	7.00
18-20	18/12 to 20/12	7.50
20-21	20/12 to 21/12	8.00

① Size according to expected snow depth.

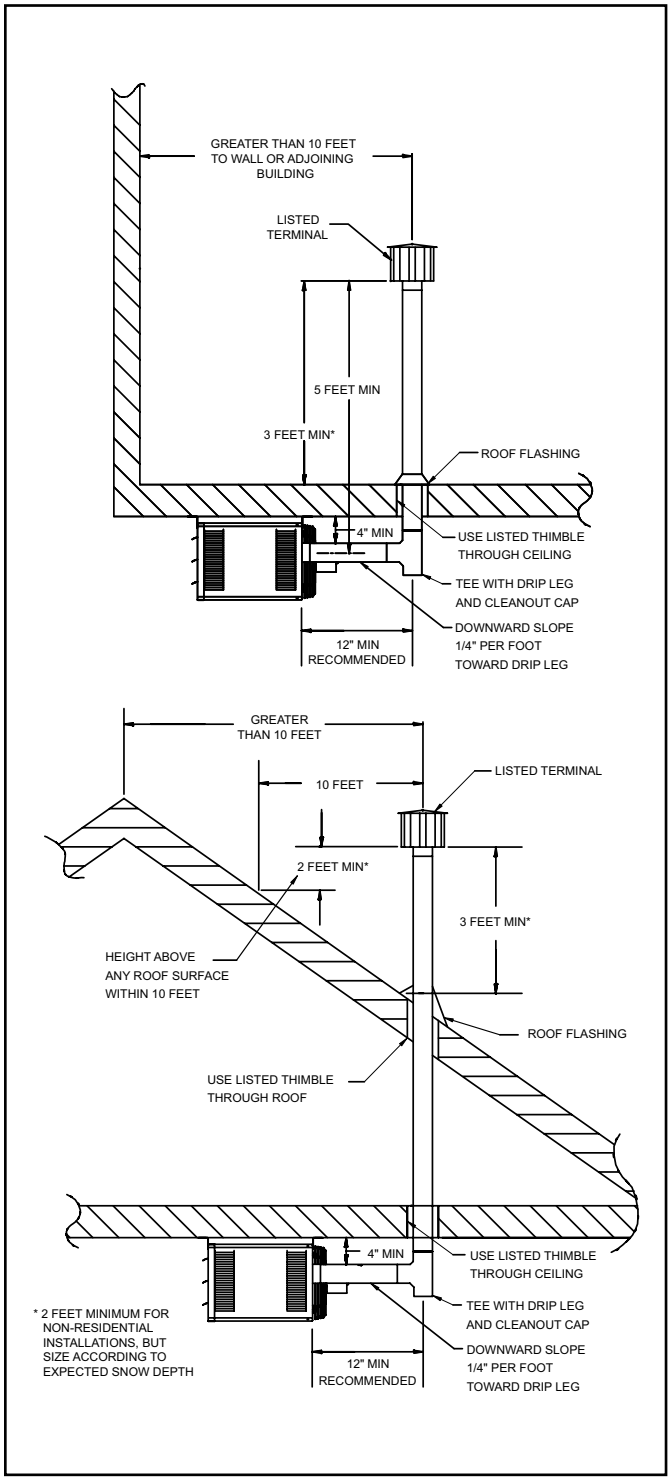
Figure 8.1 - Vertical Vent Termination for Double Wall Vent Pipe and Greater Than or Less Than 8' Horizontally From a Vertical Wall or Obstruction


IF DISTANCE TO ADJACENT WALL IS LESS THAN 8 FEET, THEN VENT MUST TERMINATE AT LEAST 2 FEET ABOVE THE HIGHEST POINT OF THE WALL THAT IS WITHIN 8 FEET HORIZONTAL. OTHERWISE, REFER TO TABLE 8.1 FOR "H" DIMENSION.
ROOF FLASHING
LISTED TERMINAL
"H" MIN* (SEE TABLE 8.1)
USE LISTED THIMBLE THROUGH CEILING AND ROOF
TEE WITH DRIP LEG AND CLEANOUT CAP
LISTED TERMINAL
X
"H" MIN* (SEE TABLE 8.1)
ROOF PITCH IS: X / 12
12
ROOF FLASHING
USE LISTED THIMBLE THROUGH ROOF
4" MIN
USE LISTED THIMBLE THROUGH CEILING
TEE WITH DRIP LEG AND CLEANOUT CAP
DOWNWARD SLOPE 1/4" PER FOOT TOWARD DRIP LEG
12" MIN RECOMMENDED

INSTALLATION - VENTING

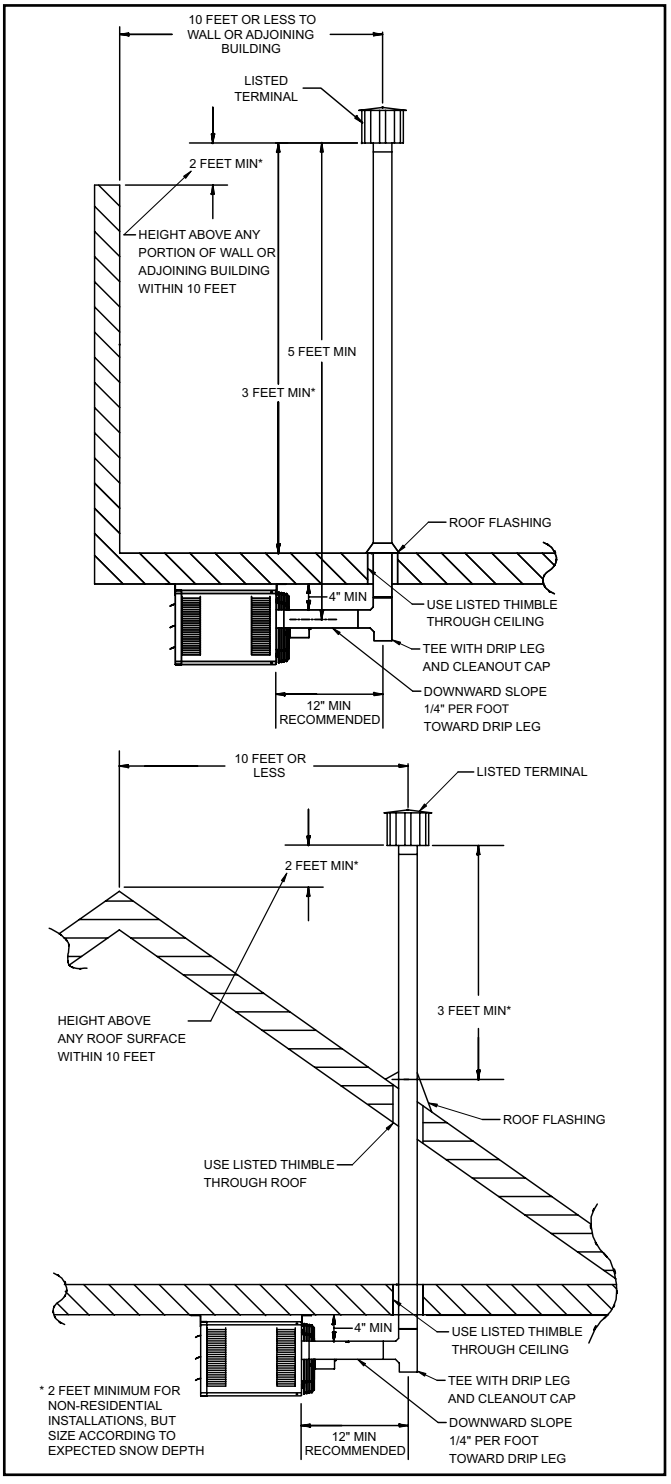
- For **single wall** vent pipe and **10' or greater** horizontal distance to any portion of a building, the vent must terminate at least 3' (2' for non-residential installations) above the highest point where it passes through a roof of a building and at least 2' higher than any portion of a building within a horizontal distance of 10'. See Figure 9.1

Figure 9.1 - Vertical Vent Termination for Single Wall Vent Pipe and Greater Than 10' Horizontally From Adjacent Wall or Building


GREATER THAN 10 FEET TO WALL OR ADJOINING BUILDING
LISTED TERMINAL
5 FEET MIN
3 FEET MIN*
ROOF FLASHING
4" MIN
USE LISTED THIMBLE THROUGH CEILING
TEE WITH DRIP LEG AND CLEANOUT CAP
DOWNWARD SLOPE 1/4" PER FOOT TOWARD DRIP LEG
12" MIN RECOMMENDED
GREATER THAN 10 FEET
10 FEET
LISTED TERMINAL
2 FEET MIN*
3 FEET MIN*
HEIGHT ABOVE ANY ROOF SURFACE WITHIN 10 FEET
ROOF FLASHING
USE LISTED THIMBLE THROUGH ROOF
4" MIN
USE LISTED THIMBLE THROUGH CEILING
TEE WITH DRIP LEG AND CLEANOUT CAP
DOWNWARD SLOPE 1/4" PER FOOT TOWARD DRIP LEG
12" MIN RECOMMENDED
* 2 FEET MINIMUM FOR NON-RESIDENTIAL INSTALLATIONS, BUT SIZE ACCORDING TO EXPECTED SNOW DEPTH

- For **single wall** vent pipe and **less than 10'** horizontal distance to any portion of a building, the vent must terminate 2' higher than any portion of that building. See Figure 9.2

Figure 9.2 - Vertical Vent Termination for Single Wall Vent Pipe and 10' or Less Horizontally From Adjacent Building or Building


10 FEET OR LESS TO WALL OR ADJOINING BUILDING
LISTED TERMINAL
2 FEET MIN*
HEIGHT ABOVE ANY PORTION OF WALL OR ADJOINING BUILDING WITHIN 10 FEET
5 FEET MIN
3 FEET MIN*
ROOF FLASHING
4" MIN
USE LISTED THIMBLE THROUGH CEILING
TEE WITH DRIP LEG AND CLEANOUT CAP
DOWNWARD SLOPE 1/4" PER FOOT TOWARD DRIP LEG
12" MIN RECOMMENDED
10 FEET OR LESS
LISTED TERMINAL
2 FEET MIN*
3 FEET MIN*
HEIGHT ABOVE ANY ROOF SURFACE WITHIN 10 FEET
ROOF FLASHING
USE LISTED THIMBLE THROUGH ROOF
4" MIN
USE LISTED THIMBLE THROUGH CEILING
TEE WITH DRIP LEG AND CLEANOUT CAP
DOWNWARD SLOPE 1/4" PER FOOT TOWARD DRIP LEG
12" MIN RECOMMENDED
* 2 FEET MINIMUM FOR NON-RESIDENTIAL INSTALLATIONS, BUT SIZE ACCORDING TO EXPECTED SNOW DEPTH

B10. Once venting is complete, proceed section titled "Installation – Gas Connections".

INSTALLATION - VENTING

Section C – Horizontal, Category III Vent System Installation

C1. This section applies to horizontally vented Category III vent systems and is in addition to "Section A – General Instructions – All Units".

C2. All heaters that are horizontally vented with 3" (for sizes 30-75) vent pipe perform as a Category III appliance. Category III venting has special venting requirements as follows:

- All **residential**, horizontally vented Category III heaters must be vented with an agency certified (UL1728) Category III venting system. Agency certified Category III venting systems are available from your local vent pipe distributor. Follow the agency certified Category III vent manufacturers instructions for installations.
- For **commercial and industrial** horizontally vented heaters you may use either agency certified Category III venting systems as noted above, or single wall galvanized or stainless steel vent pipe. If single wall vent pipe is used, all seams and joints must be sealed with metallic tape or silastic suitable for temperatures up to 400°F. Wrap the tape two full turns around the vent pipe. For single wall vent systems, one continuous section of double wall vent pipe may be used within the vent system. Refer to instruction A10 in "Section A – General Instructions – All Units" for attaching double wall pipe to single wall pipe.

C3. Limit the total equivalent vent pipe length to a minimum of 3' and a maximum of 30', making the vent system as straight as possible. The equivalent length of a 3" elbow is 1'.

C4. All horizontal Category III vents must be terminated with a Gary Steel 1092 vent cap. The cap must terminate a minimum distance from the external wall, as summarized in Table 10.1.

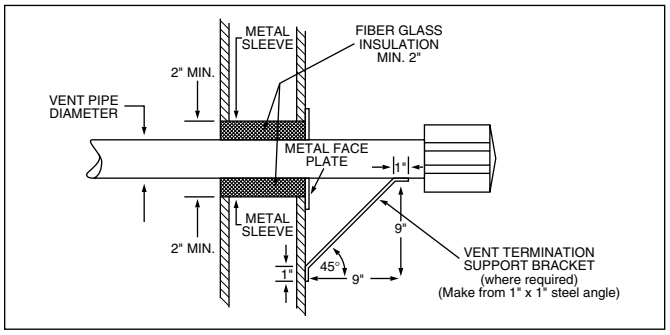
Table 10.1
Minimum Length Between External Wall and Vent

Model Size	Application	Min. Length A ①
30-75	Residential & Commercial	11"

① Refer to Figure 10.2 and 10.3.

C5. The vent must be supported as shown in Figure 10.1.

Figure 10.1 - Exhaust Vent Construction Through Combustible Walls and Support Bracket



C6. When condensation may be a problem, the vent system shall not terminate over public walkways or over an area where condensate or vapor could create a nuisance or hazard or could be detrimental to the operation of regulators, relief openings, or other equipment.

C7. The venting system must be exclusive to a single unit, and no other unit is allowed to be vented into it. For common venting, the unit must be vented as a Category I appliance. Please refer to "Section D – Horizontal, Category I Vent System Installation."

C8. When vented horizontally, maintain a 1/4" per foot rise away from the heater and place a drip leg with clean out near the unit as shown in Figure 10.2. Where local authorities have jurisdiction, a 1/4" per foot downward slope is acceptable with a drip leg and clean out near the exit of the vent as shown in Figure 10.3, or allow the condensate to drip out the end.

Figure 10.2 - Horizontal Category III Venting with Upward Pitch

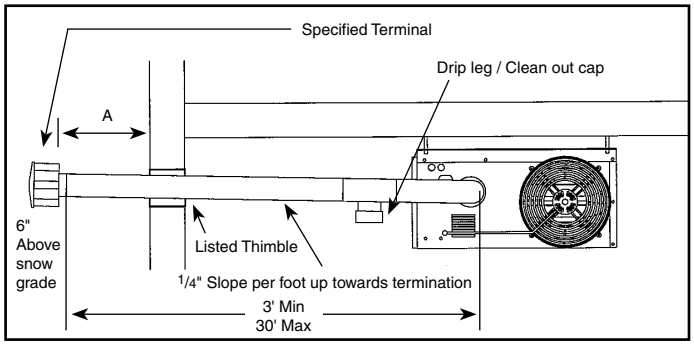
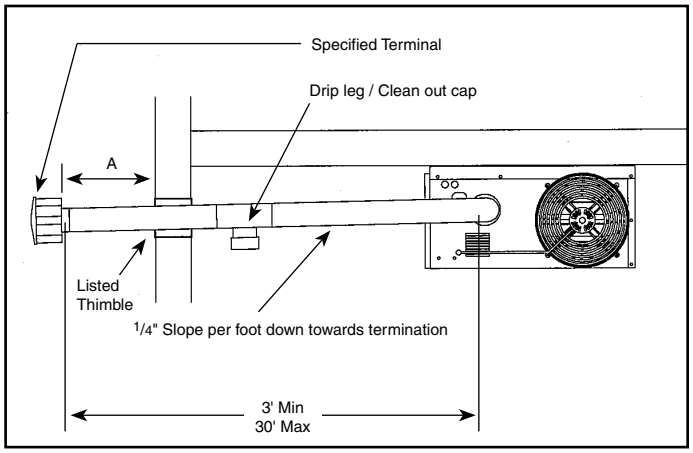


Figure 10.3 - Horizontal Category III Venting with Downward Pitch (with drip leg)



C9. For a vent termination located under an eave, the distance of the overhang must not exceed 24". The clearance to combustibles above the exterior vent must be maintained at a minimum of 12". Consult the National Fuel Gas Code for additional requirements for eaves that have ventilation openings.

C10. Once venting is complete, proceed section titled "Installation – Gas Connections".

INSTALLATION - VENTING

Section D – Horizontal, Category I Vent System Installation (Residential Only)

D1. This section applies to horizontally vented Category I vent systems and is in addition to "Section A – General Instructions – All Units".

D2. Units can be vented with a Horizontal Category I vent system for residential installations only. If the installation is non-residential, please refer to "Section C – Horizontal, Category III Vent System Installation" for proper venting instructions.

D3. All heaters installed with Category I horizontal vents must be equipped with a vent transition to 4" or 5" vent diameter for sizes 30-75. All portions of the vent system shall consist of 4" or 5" diameter single wall vent pipe and fittings. The requirements for selection of vent diameter are shown in Table 11.1.

Table 11.1 Horizontal Category I Vent System Limitations

Model Size	Vent Terminal	Maximum No. of Elbows	Minimum Vertical Rise From Horizontal (in)	Maximum Horizontal Vent Length (ft)	Vent Diameter (in)
30	TEE	1	0	10	5
	TEE	1	0	5	4
	Cap	2 ①	4 ②	10	5
	Cap	2 ①	12 ②	5	4
	Cap	2 ①	18 ②	10	4
45	TEE	1	0	10	5
	Cap	2 ①	12 ②	10	5
	Cap	2 ①	18 ②	5	4
60	TEE	1	0	10	5
	Cap	2 ①	15 ②	10	5
75	TEE	1	0	5	5
	Cap	2 ①	18 ②	5	5

① One of the two allowed elbows is required to create the vent extension shown in figures 12.3 and 12.4.

② The vertical rise gained from an elbow is 4". Therefore, 4" may be subtracted from the length of vertical pipe needed in the vent extension. If the minimum vertical rise required is 4" you do not need to add a section of vertical pipe to the vent extension.

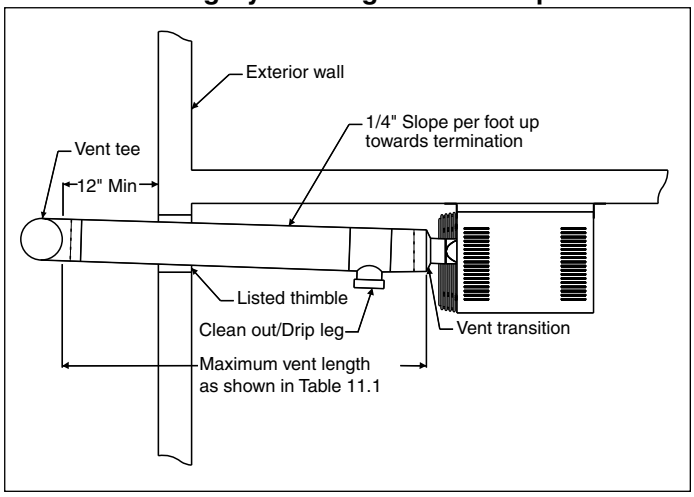
D4. All seams and joints of the single wall pipe must be sealed with metallic tape or silastic suitable for temperatures up to 400°F. Wrap the tape two full turns around the vent pipe. One continuous section of double wall vent pipe may be used within the vent system. Refer to instruction A10 in "Section A – General Instructions – All Units" for attaching double wall pipe to single wall pipe.

D5. The maximum length of the horizontal run of the vent shall be limited to the length listed in Table 11.1. The vent terminal for a horizontal category I vent may be either a standard vent TEE or a Gary Steel 1092. The maximum number of elbows, slope of the horizontal section, and minimum vertical rise from horizontal vent pipe for each configuration is listed in Table 11.1.

- When using a standard vent TEE, the preferred orientation is for the open ends of the TEE to be oriented horizontally. In this orientation, the minimum clearance to combustibles is 6" above the TEE to the eave. If the TEE is oriented vertically, the minimum clearance to combustibles is 27" above the TEE to the eave. Refer to Figure 12.1. The vent TEE should incorporate a bird screen made from corrosion resistant material. The individual strands of mesh in the bird screen must be located at least 1/4" apart.
- When using a vent cap, the minimum clearance to combustibles is 6" above the cap to the eave. Refer to Figure 12.1.

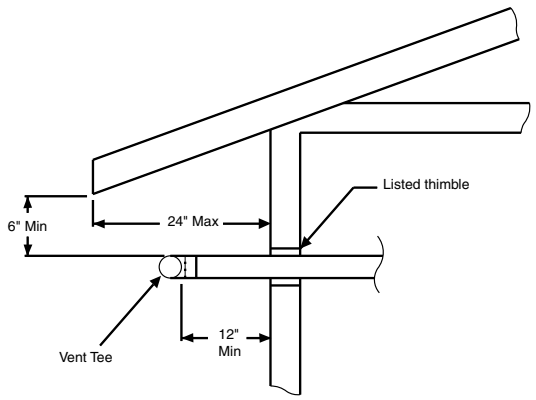
D6. When vented horizontally, maintain a 1/4" per foot rise away from the heater. Place a drain tee and clean out near the vent connector. See Figures 11.1 and 12.3. Where local authorities have jurisdiction, a 1/4" per foot downward slope is acceptable. The Condensate is allowed to drip out of the end when using a TEE terminal. See Figure 12.2. When using a vent cap with an extension, a 3/8" diameter hole is drilled in the low point of the vent by the installer exterior to the space to allow condensation drainage. See Figure 12.4.

Figure 11.1
Horizontal Category I Venting -TEE With Upward Pitch

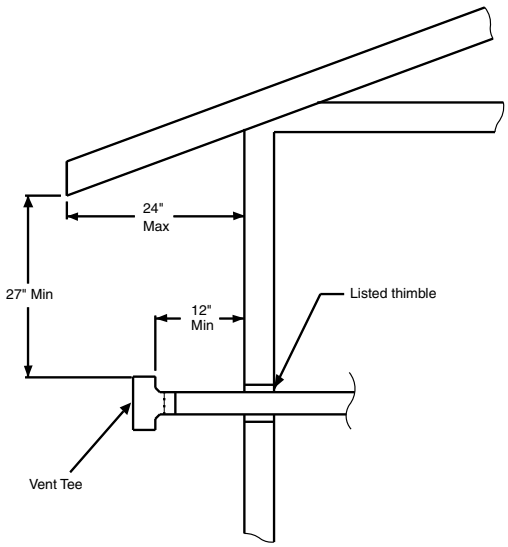


D7. If the unit will not be common vented with other appliances, then proceed to the section titled "Installation - Gas Connections". Otherwise, proceed to page 13.

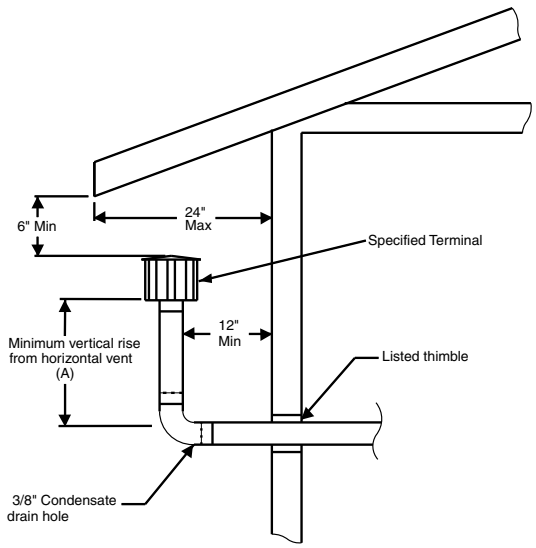
Figure 12.1
Horizontal Category I Venting - Clearance to Eave



Horizontal vent tee configuration



Vertical vent tee configuration



Vent extension configuration

Figure 12.2
Horizontal Category I Venting -
TEE With Downward Pitch

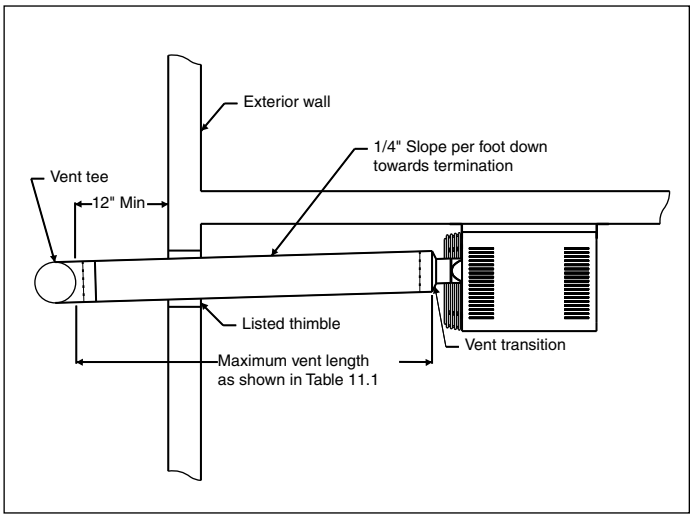


Figure 12.3
Horizontal Category I Venting -
Vent Extension With Upward Pitch

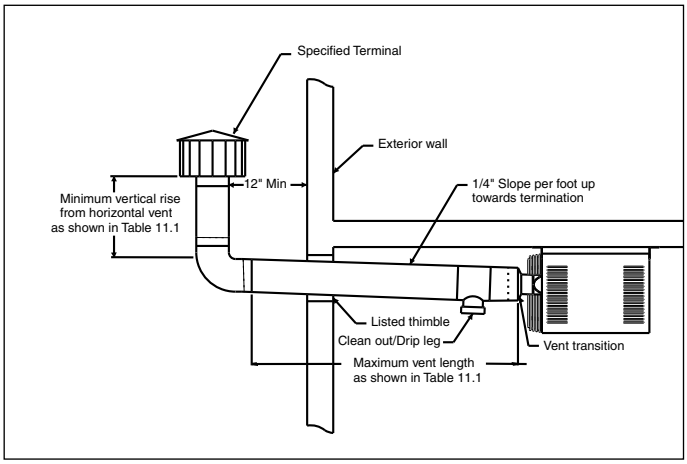
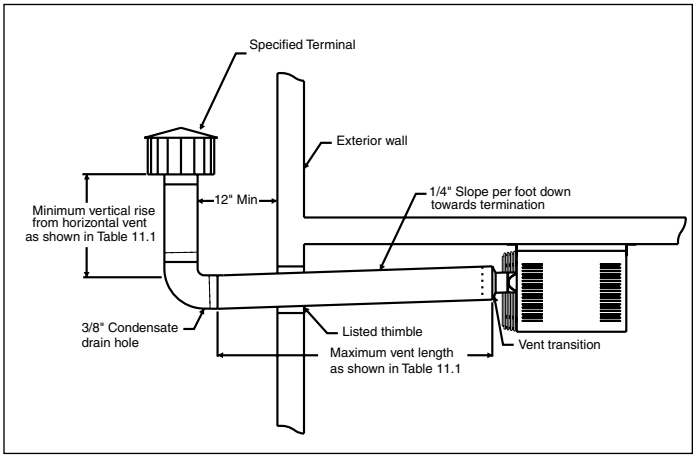


Figure12.4
Horizontal Category I Venting -
Vent Extension With Downward Pitch



INSTALLATION - VENTING

Additional Requirements for Common Venting:

1. The common vent system and all attached appliances must be Category I.
2. The vent connector should be routed in the most direct route from the units to the common vent.
3. Where two or more vent connectors enter a common gas vent or chimney flue, the smaller connector shall enter at the highest level consistent with the available head room or clearance to combustible material.
4. Restrictions within the common vent such as elbows should be minimized. Each elbow installed within the common portion of the venting system reduces maximum common vent capacity by 10% (refer to Tables 13.2 and 13.4 for capacity)
5. The vent connector capacities included in these tables allow for the use of two 90 degree elbows (or turns). For each additional elbow, the vent connector capacity shall be reduced by 10%. Refer to NFPA54/ IFEC tables for capacity ratings.
6. The common vent cross sectional area must be equal to or greater than the largest vent connector cross-sectional area.
7. If all appliances are located on one level of the building, the vent height shall be measured from the highest draft hood or vent connector to be installed within the common vent system (Refer to Figures 14.1 and 14.2).
8. All units must be vented in strict accordance of the common venting Tables 13.1 through 13.4.
9. All masonry chimneys must comply with all applicable local and national codes.
10. When combining multiple vent connectors into a manifold prior to the vertical portion of the common vent, the size of the common vent manifold and the common vent shall be determined by applying a 10% reduction (.90 x maximum vent capacity from Table 13.2 or 13.4) to the common vent capacity part of the common vent tables (refer to Figure 14.3). The length of the common vent manifold (Lm) may not exceed 18 inches per inch of manifold diameter.
11. Refer to the National Fuel Gas Code for instructions on multi-level common venting and exterior masonry chimneys as well as additional installation of the listed applications.

Table 13.1 - Maximum Vent Connector Horizontal Run (ft) Type B Vent connector and Type B Common Vent

Model	Connector Dia.	Vent Height					
		6 ft.	8 ft.	10 ft.	15 ft.	20 ft.	30 ft.
30	3	6	8	10	10	11	12
	4	4	4	4	5	5	6
	5	NA	NA	NA	NA	NA	NA
45	3	NA	NA	NA	4.5	9	13.5
	4	6	8	10	10	14	15
	5	NA	NA	NA	NA	NA	NA
60	3	NA	NA	NA	NA	NA	4.5
	4	6	8	10	15	20	23
	5	6	8	10	14	15	17
75	4	NA	NA	10	15	20	30
	5	6	8	10	15	20	24

Based on NFPA 54 (ANSI Z223.1)2002. For reference only.

Table 13.2 - Maximum total appliance input Capacities (MBh) Type B Vent connector and Type B Common Vent

Vent Height (ft)	Diameter of Common Vent							
	4 in.		5 in.		6 in.		7 in.	
	Fan+ Fan	Fan+ Nat	Fan+ Fan	Fan+ Nat	Fan+ Fan	Fan+ Nat	Fan+ Fan	Fan+ Nat
6	92	81	140	116	204	161	309	248
8	101	90	155	129	224	178	339	275
10	110	97	169	141	243	194	367	299
15	125	112	195	164	283	228	427	352
20	136	123	215	183	314	255	475	394
30	152	138	244	210	361	297	547	459

Based on NFPA 54 (ANSI Z223.1)2002. For reference only.

Table 13.3 - Maximum Connector Horizontal Run (ft) Type B Vent connector with common vent into Masonry Chimney

Model	Connector Dia. (in)	Vent Height					
		6 ft.	8 ft.	10 ft.	15 ft.	20 ft.	30 ft.
30	3	4.5	4.5	4.5	4.5	4.5	4.5
	4	NA	NA	NA	NA	NA	NA
	5	NA	NA	NA	NA	NA	NA
45	3	4.5	4.5	4.5	4.5	4.5	4.5
	4	6	6	6	6	6	6
	5	NA	NA	NA	NA	NA	NA
60	3	NA	NA	NA	NA	NA	NA
	4	6	6	6	6	6	6
	5	7.5	7.5	7.5	7.5	7.5	7.5
75	4	NA	6	6	6	6	6
	5	7.5	7.5	7.5	7.5	7.5	7.5

Based on NFPA 54 (ANSI Z223.1)2002. For reference only.

Table 13.4 - Maximum total appliance input Capacities (MBh) Type B Vent connector with common vent into Masonry Chimney

Vent Height (ft.)	Area of Common Vent							
	12 in^2		19 in^2		28 in^2		38 in^2	
	Fan+ Fan	Fan+ Nat	Fan+ Fan	Fan+ Nat	Fan+ Fan	Fan+ Nat	Fan+ Fan	Fan+ Nat
6	NA	74	NA	119	NA	178	NA	257
8	NA	80	NA	130	NA	193	NA	279
10	NA	84	NA	138	NA	207	NA	299
15	NA	NA	NA	152	NA	233	NA	334
20	NA	NA	NA	NA	NA	250	NA	368
30	NA	NA	NA	NA	NA	270	NA	404

Based on NFPA 54 (ANSI Z223.1)2002. For reference only.

INSTALLATION - VENTING / GAS CONNECTIONS

Figure 14.1
Common Venting into Double Wall B Vent

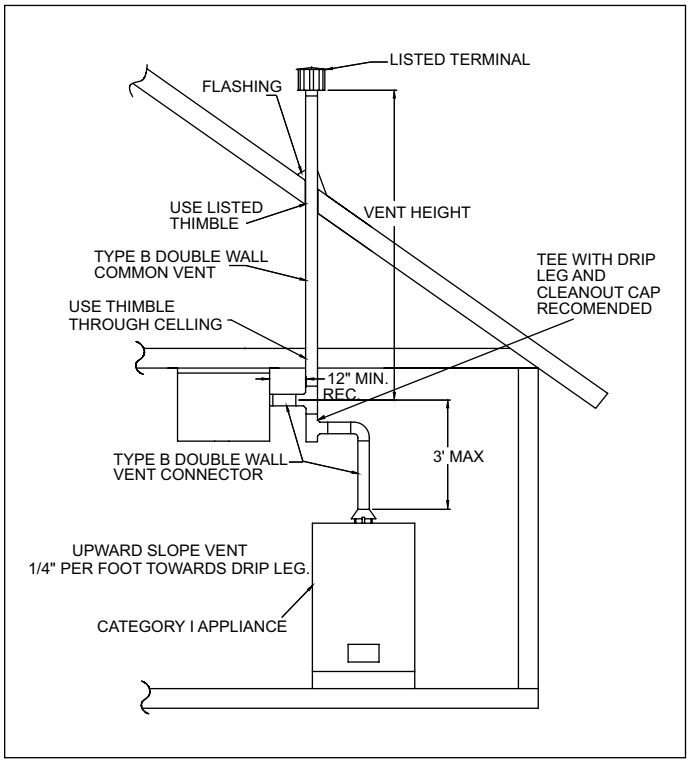

LISTED TERMINAL
FLASHING
USE LISTED THIMBLE
VENT HEIGHT
TYPE B DOUBLE WALL COMMON VENT
TEE WITH DRIP LEG AND CLEANOUT CAP RECOMENDED
USE THIMBLE THROUGH CELLING
12" MIN. REC.
TYPE B DOUBLE WALL VENT CONNECTOR
3' MAX
UPWARD SLOPE VENT 1/4" PER FOOT TOWARDS DRIP LEG.
CATEGORY I APPLIANCE

Figure 14.2
Common Venting into Masonry Chimney

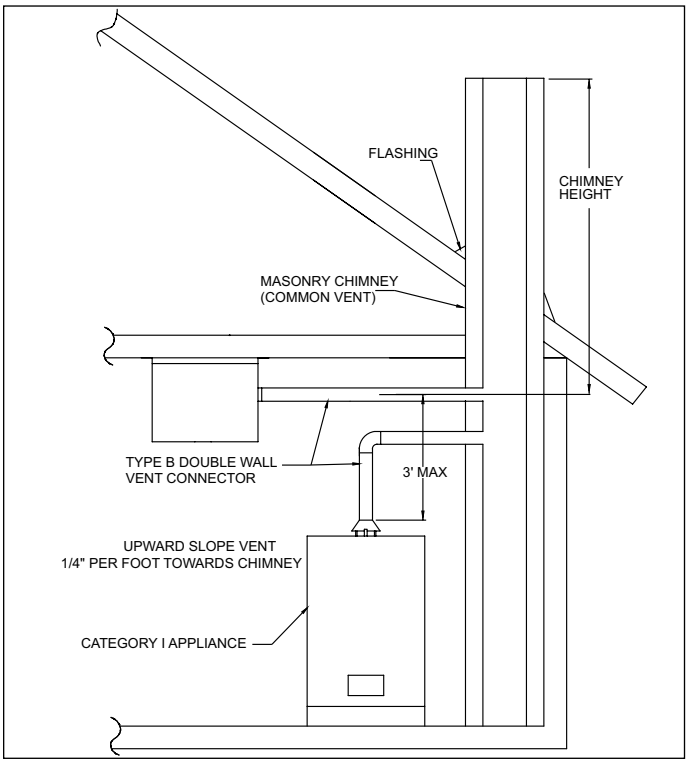
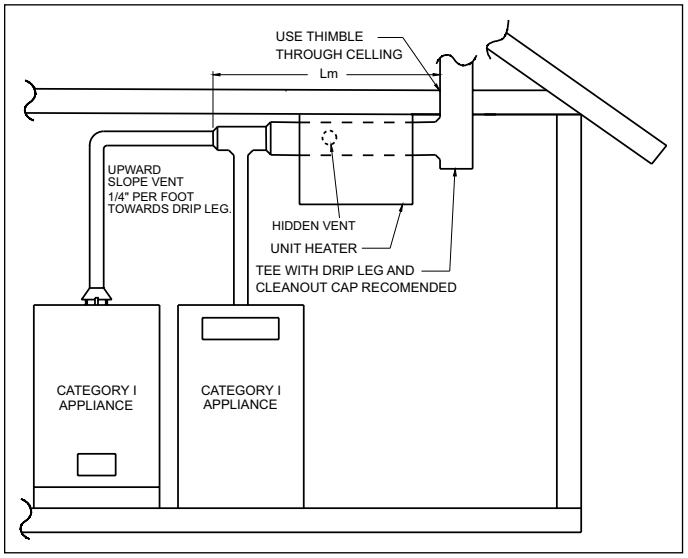


Figure 14.3
Common Venting into Manifold


USE THIMBLE THROUGH CELLING
Lm
UPWARD SLOPE VENT 1/4" PER FOOT TOWARDS DRIP LEG.
HIDDEN VENT
UNIT HEATER
TEE WITH DRIP LEG AND CLEANOUT CAP RECOMENDED
CATEGORY I APPLIANCE
CATEGORY I APPLIANCE

GAS CONNECTIONS

⚠ WARNING

1. All field gas piping must be pressure/leak tested prior to operation. Never use an open flame. Use a soap solution or equilavent for testing.
2. Gas pressure to appliance controls must never exceed 14" W.C. (1/2 psi).
3. To reduce the opportunity for condensation, the minimum sea level input to the appliance, as indicated on the serial plate, must not be less than 5% below the rated input, or 5% below the minimum rated input of dual rated units.

⚠ CAUTION

1. Purging of air from gas lines should be performed as described in ANSI Z223.1 - latest edition “National Fuel Gas Code”, or in Canada CSA-B149 codes.
2. When leak testing the gas supply piping system, the appliance and its combination gas control must be isolated during any pressure testing in excess of 14" W.C. (1/2 psi).
3. The unit should be isolated from the gas supply piping system by closing its field installed manual shut-off valve.This manual shut-off valve should be located within 6' of the heater.
4. Turn off all gas before installing appliance.

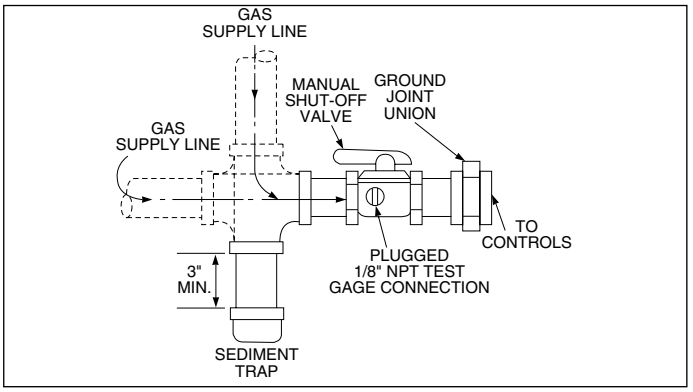
INSTALLATION - GAS CONNECTIONS

IMPORTANT

To prevent premature heat exchanger failure, the input to the appliance, as indicated on the serial plate, must not exceed the rated input by more than 5%.

1. Installation of piping must conform with local building codes, or in the absence of local codes, with the National Fuel Gas Code, ANSI Z223.1 (NFPA 54) - latest Edition. In Canada, installation must be in accordance with CSA-B149.1.
2. Piping to units should conform with local and national requirements for type and volume of gas handled, and pressure drop allowed in the line.Refer to Table 15.1 to determine the cubic feet per hour (CFH) for the type of gas and size of unit to be installed. Using this CFH value and the length of pipe necessary, determine the pipe diameter from Table 15.2. Where several units are served by the same main, the total capacity, CFH and length of main must be considered. Avoid pipe sizes smaller than 1/2". Table 15.2 allows for a 0.3" W.C. pressure drop in the supply pressure from the building main to the unit. The inlet pressure to the unit must be 6-7" W.C. for natural gas and 11-14" W.C. for propane gas. When sizing the inlet gas pipe diameter, make sure that the unit supply pressure can be met after the 0.3" W.C. has been subtracted. If the 0.3" W.C. pressure drop is too high, refer to the Gas Engineer's Handbook for other gas pipe capacities.
3. Install a ground joint union with brass seat and a manual shut-off valve adjacent to the unit for emergency shut-off and easy servicing of controls, including a 1/8" NPT plugged tapping accessible for test gauge connection (See Figure 15.1).
4. Provide a sediment trap before each unit in the line where low spots cannot be avoided. (See Figure 15.1).
5. When Pressure/Leak testing, pressures above 14" W.C. (1/2 psi), close the field installed shut-off valve, disconnect the appliance and its combination gas control from the gas supply line, and plug the supply line before testing. When testing pressures 14" W.C. (1/2 psi) or below, close the manual shut-off valve on the appliance before testing.

Figure 15.1
Recommended Sediment Trap/Manual Shut-off Valve Installation - Side or Bottom Gas Connection①



① Manual shut-off valve is in the "OFF" position when handle is perpendicular to pipe.

Table 15.1 Manifold Pressure & Gas Consumption

Model Size	BTU/Cu. Ft. Specific Gravity	Natural 1050 0.60	Propane 2500 1.53	No. of Orifices
Manifold Pressure In. W.C.		**3.5**	**10.0**	
30	CFH	28.6	12.0	2
	Gal/Hr. Propane		.33	
	Sec/cu. ft.	126	300	
	Orifice Drill Size	49	56	
45	CFH	42.9	18.0	3
	Gal/Hr. Propane		.50	
	Sec/cu. ft.	84	200	
	Orifice Drill Size	49	56	
60	CFH	57.1	24.0	4
	Gal/Hr. Propane		.66	
	Sec/cu. ft.	63	150	
	Orifice Drill Size	49	56	
75	CFH	71.4	30.0	5
	Gal/Hr. Propane		.83	
	Sec/cu. ft.	50	180	
	Orifice Drill Size	49	56	

Table 15.2
Gas Pipe Capacities

Gas Pipe Capacities (Up to 14" W.C. Gas Pressure through Schedule 40 Pipe)
Cubic Feet per Hour with Pressure Drop of 0.3" W.C.
Natural Gas - Specific Gravity - 0.60
Propane Gas - Specific Gravity - 1.50

Length of Pipe (feet)	Pipe Diameter											
	1/2"		3/4"		1"		1-1/4"		1-1/2"		2"	
	Natural	Propane	Natural	Propane	Natural	Propane	Natural	Propane	Natural	Propane	Natural	Propane
10	132	83	278	175	520	328	1050	662	1600	1008	3050	1922
20	92	58	190	120	350	221	730	460	1100	693	2100	1323
30	73	46	152	96	285	180	590	372	890	561	1650	1040
40	63	40	130	82	245	154	500	315	760	479	1450	914
50	56	35	115	82	215	135	440	277	670	422	1270	800
60	50	32	105	66	195	123	400	252	610	384	1150	725
70	46	29	96	60	180	113	370	233	560	353	1050	662
80	43	27	90	57	170	107	350	221	530	334	930	586
100	38	24	79	50	150	95	305	192	460	290	870	548
125	34	21	72	45	130	82	275	173	410	258	780	491
150	31	20	64	40	120	76	250	158	380	239	710	447

INSTALLATION - ELECTRICAL CONNECTIONS

ELECTRICAL CONNECTIONS

⚠ WARNING

1. Disconnect power supply before making wiring connections to prevent electrical shock and equipment damage.
2. All appliances must be wired strictly in accordance with wiring diagram furnished with the appliance. Any wiring different from the wiring diagram could result in a hazard to persons and property.
3. Any original factory wiring that requires replacement must be replaced with wiring material having a temperature rating of at least 105°C.
4. Ensure that the supply voltage to the appliance, as indicated on the serial plate, is not 5% greater than rated voltage.

⚠ CAUTION

Ensure that the supply voltage to the appliance, as indicated on the serial plate, is not 5% less than the rated voltage.

All field installed wiring must be done in accordance with the National Electrical Code ANSI/NFPA 70 – latest edition or Canadian Electrical Code CSA C22.1 Part 1 or local codes. Unit must be electrically grounded according to these codes. If any of the original wire supplied with the heater must be replaced, replace it with wiring material having a temperature rating of at least 105°C.

The power to these unit heaters should be protected with a circuit breaker.

Location of thermostat should be determined by heating requirements and be mounted on an inside wall about 5' above floor level where it will not be affected by heat from the unit or other sources, or drafts from frequently opened doors. See instructions packed with thermostat.

OPERATION

Prior to Operation

IMPORTANT

Start-up and adjustment procedures should be performed by a qualified service agency.

Although this unit has been assembled and fire-tested at the factory, the following pre-operational procedures should be performed to assure proper on-site operation.

1. Turn off power to the unit at the disconnect switch. Check that fuses or circuit breakers are in place and sized correctly. Turn all hand gas valves to the “OFF” position.
2. Remove the side control access panel.
3. Check that the supply voltage matches the unit supply voltage listed on the Model Identification plate. Verify that all wiring is secure and properly protected. Trace circuits to insure that the unit has been wired according to the wiring diagram.
4. Check to insure that the venting system is installed correctly and free from obstructions. Before you start use the following steps to verify that the venting system is adequately sized:
   a. Seal any unused openings in the venting system.
   b. Inspect the venting system for proper size and horizontal pitch, as required in the National Fuel Gas Code ANSI Z223.1 or CSA B149.1 Installation Code-latest edition and these instructions. Determine that there is no blockage or restriction, leakage, corrosion and other deficiencies, which could cause an unsafe condition.
   c. In so far as practical, close all building doors and windows and all doors between the space in which the appliance(s) connected to the venting system are located and other spaces of the building. Turn on clothes dryers and any exhaust fans such as range hoods and bathroom exhausts, so they shall operate at maximum speed. Do not operate a summer exhaust fan. Close fireplace dampers.
   d. Follow the lighting instructions. Place the appliance being inspected in operation. Adjust thermostat so that the appliance will operate continuously.
   e. After it has been determined that each appliance connected to the venting system properly vents when tested as outlined above, return doors, windows, exhaust fans, fireplace dampers and any other gas-burning appliance to their previous conditions of use.
   f. If improper venting is observed during any of the above tests, the venting system must be corrected.
5. Check to see that there are no obstructions to the intake and discharge of the unit.
6. Check fan clearance. Fan should not contact casing when spun by hand.
7. Perform a visual inspection of the unit to make sure no damage has occurred during installation.
8. Check that all horizontal deflector blades are open a minimum of 30° as measured from vertical.
9. Turn on power to the unit at the disconnect switch.
10. Check the thermostat, ignition control, gas valve, and supply fan blower motor for electrical operation. If these do not function, recheck the wiring diagram.
11. Check the motor speed (rpm).
12. Check the motor voltage.
13. Check the motor amp draw to make sure it does not exceed the motor nameplate rating.
14. Recheck the gas supply pressure at the field installed manual shut-off valve. The minimum inlet pressure should be 6" W.C. on natural gas and 11" W.C. on propane gas. The maximum inlet pressure for either gas is 14" W.C. If inlet pressure exceeds 14" W.C., a gas pressure regulator must be added upstream of the combination gas valve.
15. Open the field installed manual gas shut-off valve.
16. Place the manual main gas valve on the combination gas valve in the "On" position. Call for heat with the thermostat.
17. Check to make sure that the main gas valve opens. Check the manifold gas pressure (See Main Gas Adjustment) while the supply fan blower is operating.
18. Check to insure that gas controls sequence properly (See Control Operating Sequence). If you are not familiar with the unit’s controls (i.e. combination gas control), refer to the control manufacturer’s literature supplied with the unit.
19. Once proper operation of the unit has been verified, remove any jumper wires that were required for testing.
20. Replace the side control access panel.

Main Gas Adjustment

The gas pressure regulator (integral to the combination gas control) is adjusted at the factory for average gas conditions. It is important that gas be supplied to the unit heater in accordance with the input rating on the serial plate. Actual input should be checked and necessary adjustments made after the unit heater is installed. Over-firing, a result of too high an input, reduces the life of the appliance and increases maintenance. Under no circumstances should the input exceed that shown on the serial plate.

Measuring the manifold pressure is done at the outlet pressure tap of the gas valve.

To Adjust the Manifold Pressure

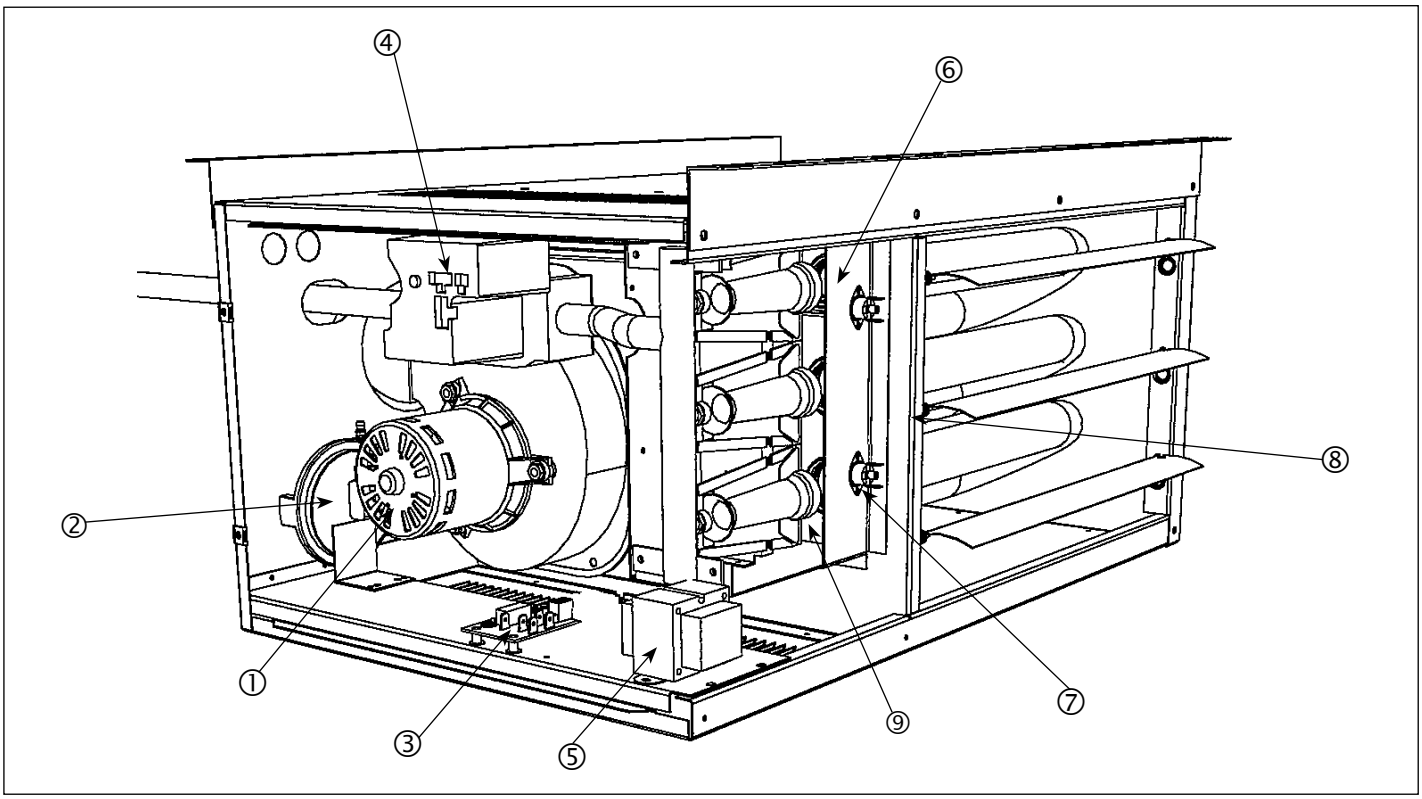
1. Move the field installed manual shut-off valve to the “OFF” position.
2. Remove the 1/8" pipe plug from the outlet pressure tap on the gas valve and attach a water manometer of “U” tube type which is at least 12" high.
3. Move the field installed manual gas shut-off valve to the “ON” position.
4. Create a high-fire call for heat from the thermostat.
5. Refer to Table 15.1 to determine the correct high fire manifold pressure for the gas type of the unit. Adjust the main gas pressure regulator spring to achieve the proper manifold pressure (for location, see the combination gas control literature supplied with unit).
6. After adjustment, move the field installed manual shut-off valve to the “OFF” position and replace the 1/8" pipe plug.
7. After the plug is in place, move the field installed manual shut-off valve to the “ON” position and recheck pipe plugs for gas leaks with soap solution.

CONTROL OPERATING SEQUENCE / UNIT COMPONENTS

CONTROL OPERATING SEQUENCE

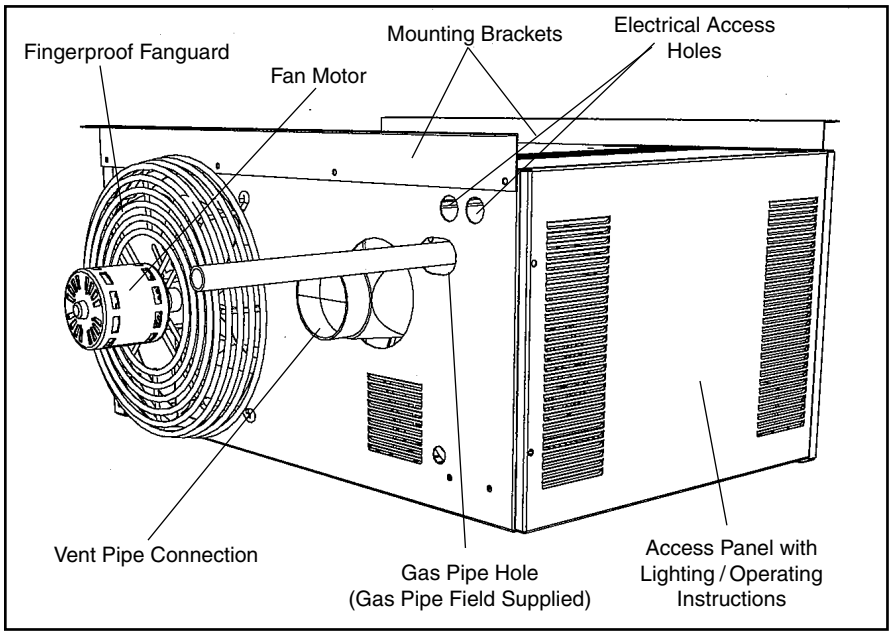
Upon a call for heat from the thermostat, power is supplied to the power exhauster motor. The unit will go through a purge period and then the direct spark igniter will be energized. At the same time, the main valve in the combination control valve will open to allow gas to flow to the burners. If the fan motor has not already started it will start shortly. If a flame is not sensed for any reason the main valve will close and there will be a short purge period before ignition is tried again. If the flame is not sensed after four tries there will be at least a one hour wait before ignition is tried again.

Figure 18.1
Major Gas, Electrical Service, Safety and Other Components

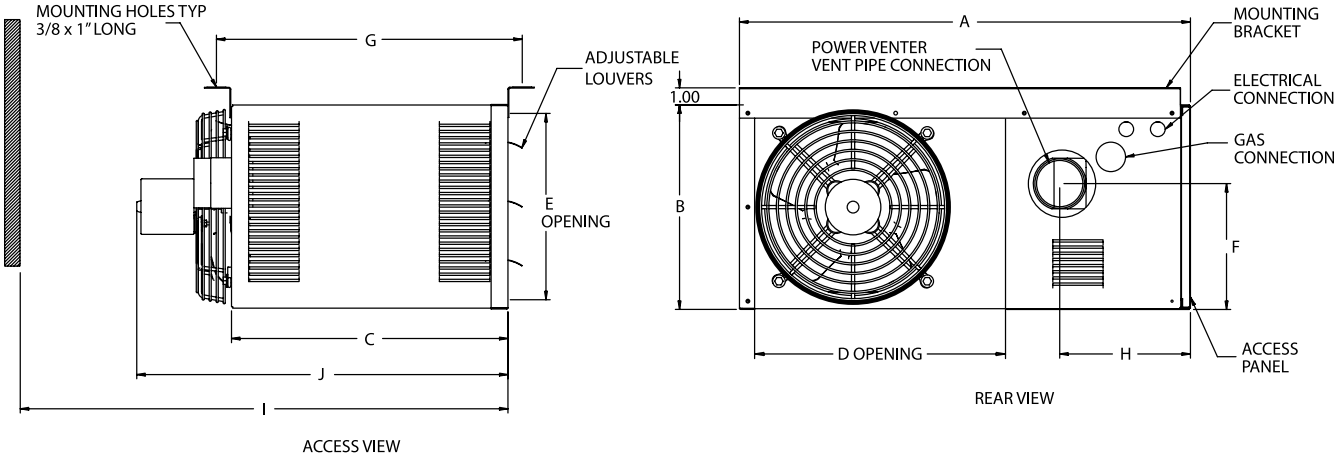


1. Power Exhauster
2. Pressure Switch
3. Integrated Direct Spark Control Board
4. Combination Gas Control
5. Control Transformer
6. Flame Sensor (hidden)
7. Flame Rollout Switch
8. Auto Reset Limit Control (hidden)
9. Direct Spark Igniter (hidden)

Figure 18.2
Unit Heater Rear View



DIMENSIONS / GENERAL PERFORMANCE DATA - MODEL WGH



Performance

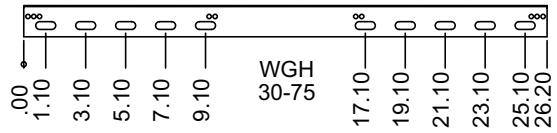
Models		WGH30	WGH45	WGH60	WGH75
Btu/Hr Input		30,000	45,000	60,000	75,00
Btu/Hr Output		24,000	36,000	48,000	60,000
Entering Airflow (CFM)		505	720	990	1,160
Outlet Velocity		523	749	653	769
Air Temp. Rise (°F)		44	46	45	48
Mounting Height (Max ft.)		10	10	12	14
Heat Throw (ft.)		25	27	36	38
Motor Data	Horsepower	1/15	1/15	1/12	1/12
	RPM	1,550	1,550	1,625	1,625
	Type	S.P.	S.P.	P.S.C.	P.S.C.
	Amps	2.4	2.4	1.2	1.2
Unit Total Amps		3.7	3.7	2.5	2.5
Vent Connector Size (in.)		3	3	3	3

Dimensions (inches)

Models	WGH30	WGH45	WGH60	WGH75
A	26.8	26.8	26.8	26.8
B	12.2	12.2	18.0	18.0
C	16.5	16.5	16.5	16.5
D	14.9	14.9	14.9	14.9
E	10.1	10.1	15.9	15.9
F	7.5	7.5	10.7	10.7
G	18.5	18.5	18.5	18.5
H	7.6	7.6	7.8	7.8
Gas Connection	1/2	1/2	1/2	1/2
I	34.5	34.5	34.5	34.5
J	22	22	25	25
Fan Diameter	10	10	14	14
Approx. Shipping Weight (lbs.)	55	60	80	85

Mounting

1" - angle, mounting brackets are slotted to accommodate joists on 16" or 24" centerlines.



Clearances

Unit Side	Clearance To Combustible Materials	Recommended Service Clearance
Top and Bottom	1"	1"
Access Side	18"	18"
Non-Access Side	1"	1"
Rear	18"	18"
Vent Connector	4"	4"

Control Options

Control Description	Control Code No.	Service Voltage	Thermostat Voltage	Type of Gas	Model Size
Single-Stage, Direct Spark Ignition, 100% Shut-Off with Continuous Retry - Utilizes a single-stage combination gas control with ignition control. Gas is lit with a direct spark igniter on call for heat.	11	115V	24V	natural	30-75
	21	115V	24V	propane	30-75

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⚠ WARNING

When servicing or repairing of this equipment, use only factory-approved service replacement parts. A complete replacement parts list may be obtained by contacting the factory. Refer to the rating plate on the appliance for complete appliance model number, serial number, and company address. Any substitution of parts or controls not approved by the factory will be at the owner's risk.

⚠ CAUTION

1. Servicing or repairing of this equipment must be performed by a qualified service agency.
2. Do not attempt to reuse any mechanical or electrical controllers which have been wet. Replace defective controller.

⚠ IMPORTANT

To check most of the Possible Remedies in the troubleshooting guide listed in Table 21.1, refer to the applicable sections of the manual.

General Maintenance

The unit and venting system must be checked once a year by a qualified service technician.

All installation and service of these units must be performed by a qualified installation and service agency.

Before any service, BE SURE TO TURN OFF GAS AT THE MANUAL SHUT-OFF VALVE AHEAD OF THE COMBINATION GAS CONTROL AND TURN OFF ALL ELECTRIC POWER TO THE HEATER.

1. Service air moving components annually.
   a. Check fan for fit on motor shaft and for damage to blades.
2. Keep unit free from dust, dirt, grease, and foreign matter, paying particular attention to:
   a. Combustion air inlets.
   b. Burners and burner orifices. Turn off gas ahead of the combination gas control and shut off electric power to the heater. Remove the access panel, open the union on the gas line, and disconnect the igniter and sensor wires. Remove the screws that attach the burner tray to the header plate and remove the burner tray and manifold assembly from the heater. Carefully clean the burners with a wire brush or other suitable means.

   Replace any damaged or deteriorating burners or orifices. Install the burner assembly back on to the header making certain that all screws, pipes and electrical connections are tight.

   CAUTION: Be careful when handling the igniter and flame sensor.
      1. Inspect the flame sensor and igniter for deterioration and/or cracks.
      2. Verify that the burners are touching each other at the carryover points. This will ensure flame carryover from burner to burner.

   c. Clean exterior of heat exchanger tubes.
   d. Fan blade.
3. Check wiring for possible loose connections.
4. Controls – The gas valves and piping should be checked annually for general cleanliness and tightness. The gas controls should be checked to insure that the unit is operating properly. See control instruction sheets furnished separately with the unit heater.
5. Power exhaust assembly/motors – The power exhaust motor bearings have been lubricated for long life and do not require additional lubrication. In dirty atmosphere, it may be desirable to clean the motors and blower housing and blow out the cooling air passages of the motor with compressed air.
6. Perform periodic cleaning of inlet and vent terminal screens.

Table 21.1
Troubleshooting

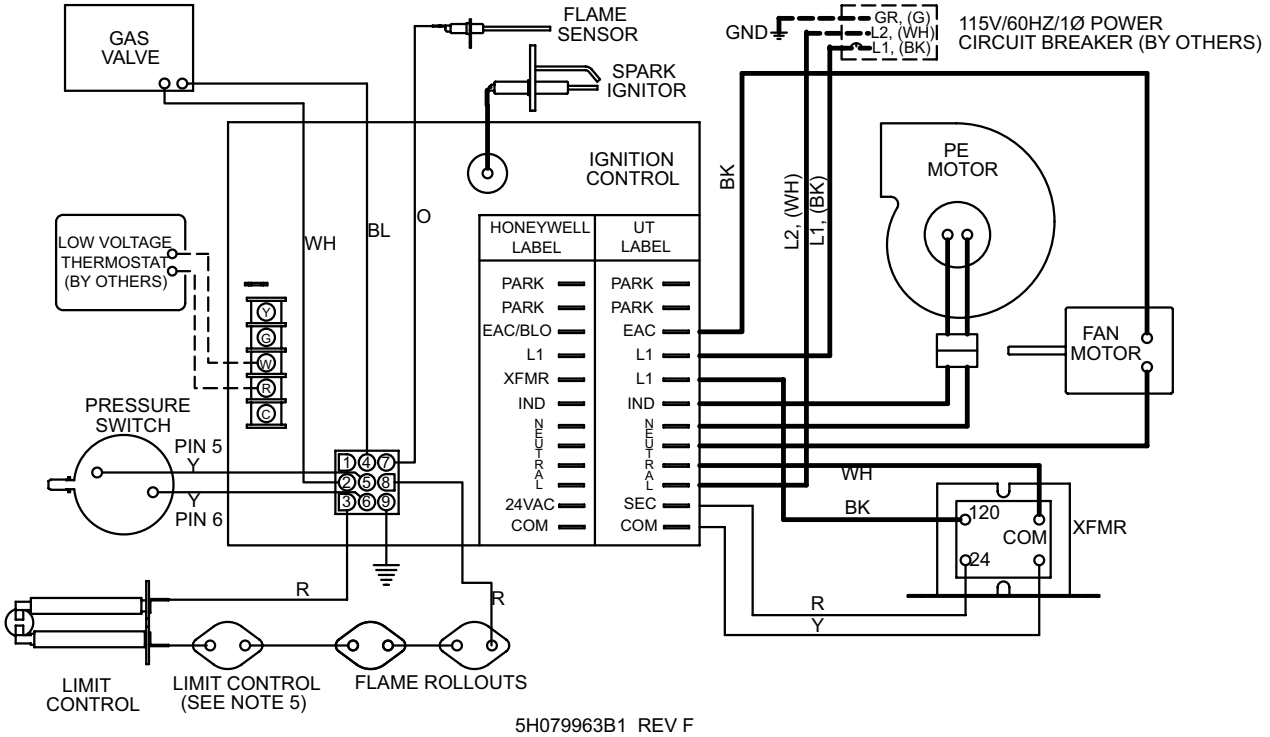
TROUBLE	POSSIBLE CAUSE	POSSIBLE REMEDY
Unit does nothing	1. Power supply is off 2. No 24V power to thermostat 3. Thermostat malfunction 4. LED flashes 5. Defective control	1. Turn on main power 2 a. Check control transformer b. If failed transformer - check thermostat wire gage and length 3 a. Verify wire connections to R&W terminals only b. Check / replace thermostat 4. Check LED flash code 5. Replace control
LED light off or flashing	1. Multiple causes	1. Control board LED flash codes vary with control type. A decal is installed in the unit giving a brief description of the applicable codes for your heater. For more detail, see the control board data sheet included with this manual.
Unit starts but does not ignite	1. Main gas is off 2. Air in gas line 3. Main or manifold gas pressure 4. Check gas valve switch	1. Open manual gas valve 2. Purge gas line 3. Set gas pressures per manual instructions 4. Set gas valve switch to "ON" position
Unit goes through cycle but the burners go out in less then 10 seconds	1. Reversed main power polarity 2. Unit not grounded 3. Flame not sensed	1. Black wire - HOT, White wire - NEUTRAL, Green wire - Ground 2. Ground unit and verify quality of ground connection 3. Check flame sense probe and connection
Air circulating fan inoperable	1. Loose connections 2. Defective control board 3. Defective fan motor	1. Check all connections 2. Check control board data sheet and function 3. Check fan motor

UNIT WIRING

Wiring Diagram Selection

Since internal or factory wiring may vary depending on the controls manufacturer, the wiring diagrams must be appropriately selected with the proper gas valve and ignition type. The following wiring diagram represents a unit equipped with a single stage gas valve, and direct spark ignition.

Figure 22.1 - Unit Heater Wiring Diagram (Single Stage, Direct Spark Ignition)



5H079963B1 REV F
SINGLE STAGE, DIRECT SPARK IGNITION,
100% SHUT-OFF, MULTIPLE RETRY W/ AUTO RESET FROM LOCKOUT

CAUTION:
FAILURE TO WIRE THIS UNIT ACCORDING TO THIS WIRING DIAGRAM MAY RESULT IN INJURY TO THE INSTALLER OR USER. FOR DEVIATIONS CONTACT THE FACTORY.

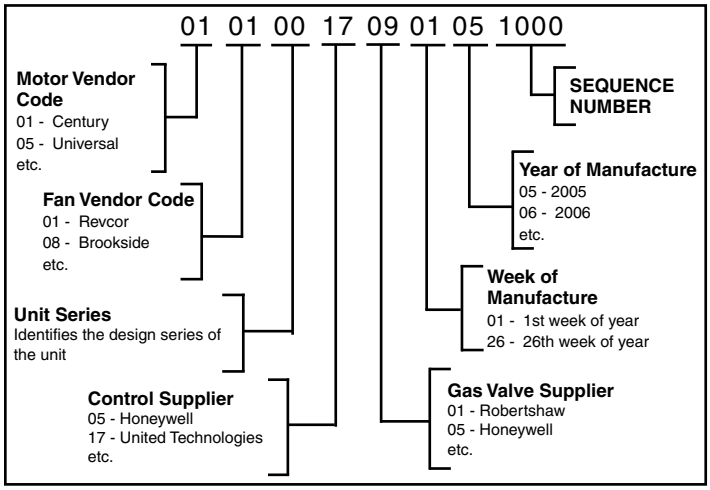
NOTES TO INSTALLER:

1. ALL WIRING MUST COMPLY WITH NATIONAL ELECTRIC CODE AND ALL LOCAL CODES.
2. ALL COMPONENTS MUST AGREE WITH THEIR RESPECTIVE POWER SOURCE.
3. VERIFY THE POWER SOURCE AND THE UNIT POLARITY.
4. USE TYPE 105°C REPLACEMENT WIRE 300V OR GREATER.
5. USED ON PROPELLER MODELS 100 AND LARGER.
6. TWO SWITCHES: 30-75

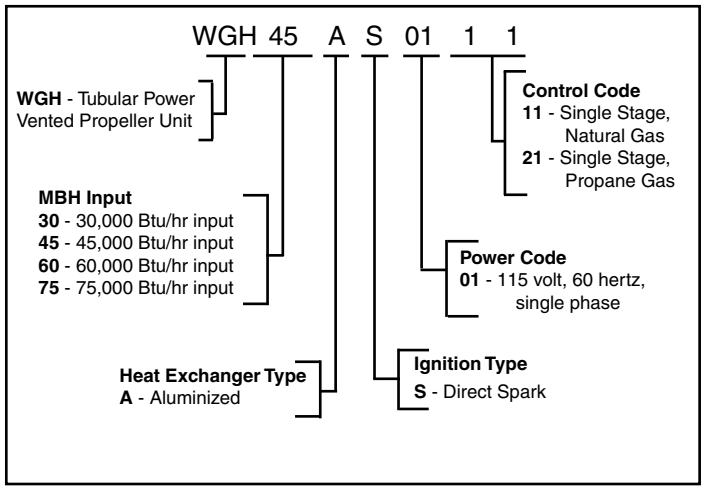
WIRING LEGEND	
FACTORY WIRING	LINE 24V
INTERNAL COMPONENT WIRING	
FIELD WIRING	
WIRE NUT	
TERMINAL BOARD CONNECTION	

SERIAL & MODEL NUMBER / REPLACEMENT PARTS

Serial Number Designations (Remove access cover to locate)



Model Number Designations (Remove access cover to locate)


WGH 45 A S 01 1 1
WGH - Tubular Power Vented Propeller Unit
MBH Input
30 - 30,000 Btu/hr input
45 - 45,000 Btu/hr input
60 - 60,000 Btu/hr input
75 - 75,000 Btu/hr input
Heat Exchanger Type
A - Aluminized
Ignition Type
S - Direct Spark
Power Code
01 - 115 volt, 60 hertz, single phase
Control Code
11 - Single Stage, Natural Gas
21 - Single Stage, Propane Gas

Replacement Parts

When requesting parts please contact your local representative. Please have full model and serial number available. If you require assistance in locating your representative, please call the number located on the back page.

Figure 22.1 Common Replacement Parts (The list is subject to change. Please refer to unit mounted parts list for most up-to-date list.)

Model Size	Power Exhauster	Limit Control Switch	Flame Roll-out Switch	Trans-former	Pressure Switch	Igniter	Ignition Control (1 Stage)	Combination Gas Valve (1 Stage)	
								Code 11	Code 21
WGH 30	5H75038	5H75769B1	5H75002-3	5H75029	5H75030-3	5H79636	5H79749	5H79751B	5H79869B
WGH 45	5H75038	5H75769B1	5H75002-3	5H75029	5H75030-3	5H79636	5H79749	5H79751B	5H79869B
WGH 60	5H75038	5H75769B2	5H75002-3	5H75029	5H75030-3	5H79636	5H79749	5H79751B	5H79869B
WGH 75	5H75038	5H75769B2	5H75002-3	5H75029	5H75030-4	5H79636	5H79749	5H79751B	5H79869B

HAMILTON HOME PRODUCTS, INC.
LIMITED WARRANTY (Residential Use Only)

WHAT THIS WARRANTY COVERS

This warranty covers all defects in material and workmanship in your Hamilton unit heater, when used for your home or garage.

WHAT THIS WARRANTY DOES NOT COVER

Unit heater, or any of its parts:

1. which have been improperly installed or removed.
2. which have been damaged other than by normal use.
3. which have not been properly maintained.
4. which have been exposed to gas input more than 5% higher than specified on the serial plate of the unit heater, resulting in over-firing of the heater.
5. which have been exposed to possibly corrosive chemicals or chemical vapors (such as found in swimming pools), or potentially explosive or flammable atmospheres laden with grain dust, sawdust, or similar air-borne materials.
6. where any defect has been caused by abuse, misuse, neglect, carelessness, or accident.
7. where the serial number of the unit heater has been altered, defaced, or removed.
8. which are used in a confined space without adequate combustion air, such as can be found in more air-tight construction.

WHO THIS WARRANTY COVERS

This warranty covers the purchaser of the unit heater or anyone else who owns it during the warranty period.

HOW LONG THE WARRANTY LASTS

1. The warranty for the heat exchanger of the unit heater remains in force for ten years from the date you purchased the unit heater.
2. The warranty on all other parts of the heater remains in force for two years from the date you purchased the unit heater.

WHAT HAMILTON WILL DO TO CORRECT ANY WARRANTY DEFECTS, AND HOW YOU CAN GET WARRANTY SERVICE

In the event of warranty failure, Hamilton will provide replacement parts at no charge, excluding shipping and handling charges. To obtain warranty repairs or replacement of defective parts, you must, within the period of warranty coverage, contact Hamilton Home Products, Inc. at 1.800.879.0123.

CAUTION - Do not attempt to repair the unit heater yourself, nor remove it or any of its parts. This must be done by a qualified service agency.

If you have any questions about this warranty, call Hamilton Home Products, Inc. at 1.800.879.0123.

WHAT HAMILTON WILL NOT DO

Hamilton will not reimburse you for any labor costs or service charges related to warranty repairs or replacements.

INCIDENTAL AND CONSEQUENTIAL DAMAGES DISCLAIMED

This warranty does not cover incidental damages, such as use of substitute heating equipment, or other costs arising from the loss of use of the unit heater. This warranty also does not cover consequential damages, such as the cost of repairing or replacing other property which is damaged when this unit heater does not work properly.

HOW STATE LAW RELATES TO THIS WARRANTY

Some states do not allow the exclusion or limitation of incidental or consequential damages so the above limitations or exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

COMMERCIAL WARRANTY

Seller warrants its products to be free from defects in material and workmanship, EXCLUSIVE, HOWEVER, of failures attributable to the use of materials substituted under emergency conditions for materials normally employed. This warranty covers replacement of any parts furnished from the factory of Seller, but does not cover labor of any kind and materials not furnished by Seller, or any charges for any such labor or materials, whether such labor, materials or charges thereon are due to replacement of parts, adjustments, repairs, or any other work done. This warranty does not apply to any equipment which shall have been repaired or altered outside the factory of Seller in any way so as, in the judgment of Seller, to affect its stability, nor which has been subjected to misuse, negligence, or operating conditions in excess of those for which such equipment was designed. This warranty does not cover the effects of physical or chemical properties of water or steam or other liquids or gases used in the equipment.

BUYER AGREES THAT SELLER'S WARRANTY OF ITS PRODUCTS TO BE FREE FROM DEFECT IN MATERIAL AND WORKMANSHIP, AS LIMITED HEREIN, SHALL BE IN LIEU OF AND EXCLUSIVE OF ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, WHETHER ARISING FROM LAW, COURSE OF DEALING, USAGE OF TRADE, OR OTHERWISE, **THERE ARE NO OTHER WARRANTIES, INCLUDING WARRANTY OF MERCHANTABILITY OR FITNESS FOR PURPOSE, WHICH EXTEND BEYOND THE PRODUCT DESCRIPTION CONFIRMED BY BUYER AND SELLER AS OF THE DATE OF FINAL AGREEMENT.**

This warranty is void if the input to the product exceeds the rated input as indicated on the product serial plate by more than 5% on gas-fired and oil-fired units, or if the product in the judgment of SELLER has been installed in a corrosive atmosphere, or subjected to corrosive fluids or gases, been subjected to misuse, negligence, accident, excessive thermal shock, excessive humidity, physical damage, impact, abrasion, unauthorized alterations, or operation contrary to SELLER'S printed instructions, or if the serial number has been altered, defaced or removed.

Heat Exchangers

For Seller's non-separated combustion Gas-Fired Unit Heaters

BUYER'S REMEDY FOR BREACH OF WARRANTY, EXCLUSIVE OF ALL OTHER REMEDIES PROVIDED BY LAW, IS LIMITED TO REPAIR OR REPLACEMENT AT THE FACTORY OF SELLER, ANY HEAT EXCHANGER WHICH SHALL, WITHIN TEN YEARS FROM DATE OF FIRST BENEFICIAL USE BY BUYER OR ANY OTHER USER, WITHIN TEN YEARS FROM DATE OF RESALE BY BUYER OR ANY OTHER USER, WITHIN TEN YEARS FROM DATE OF RESALE BY BUYER IN ANY UNCHANGED CONDITION, OR WITHIN ONE HUNDRED TWENTY-SIX MONTHS FROM DATE OF SHIPMENT FROM SELLER, WHICHEVER OCCURS FIRST, BE RETURNED TO SELLER WITH TRANSPORTATION CHARGES PREPAID AND WHICH THE EXAMINATION OF SELLER SHALL DISCLOSE TO HAVE BEEN DEFECTIVE; EXCEPT THAT WHEN THE PRODUCT IS TO BE USED BY BUYER AS A COMPONENT PART OF EQUIPMENT MANUFACTURED BY BUYER, BUYER'S REMEDY FOR BREACH, AS LIMITED HEREIN, SHALL BE LIMITED TO ONE YEAR FROM DATE OF SHIPMENT FROM SELLER. FOR GAS-FIRED PRODUCTS INSTALLED IN HIGH HUMIDITY APPLICATIONS AND UTILIZING STAINLESS STEEL HEAT EXCHANGERS, BUYER'S REMEDY FOR BREACH, AS LIMITED HEREIN, SHALL BE LIMITED TO TEN YEARS FROM DATE OF SHIPMENT FROM SELLER.

For Seller's Low Intensity Gas-Fired Infrared Heaters

BUYER'S REMEDY FOR BREACH OF WARRANTY, EXCLUSIVE OF ALL OTHER REMEDIES PROVIDED BY LAW, IS LIMITED TO REPAIR OR REPLACEMENT AT THE FACTORY OF SELLER, ANY HEAT EXCHANGER WHICH SHALL, WITHIN FIVE YEARS FROM DATE OF FIRST BENEFICIAL USE BY BUYER OR ANY OTHER USER, WITHIN FIVE YEARS FROM DATE OF RESALE BY BUYER OR ANY OTHER USER, WITHIN FIVE YEARS FROM DATE OF RESALE BY BUYER IN ANY UNCHANGED CONDITION, OR WITHIN 66 MONTHS FROM DATE OF SHIPMENT FROM SELLER, WHICHEVER OCCURS FIRST, BE RETURNED TO SELLER WITH TRANSPORTATION CHARGES PREPAID AND WHICH THE EXAMINATION OF SELLER SHALL DISCLOSE TO HAVE BEEN DEFECTIVE; EXCEPT THAT WHEN THE PRODUCT IS TO BE USED BY BUYER AS A COMPONENT PART OF EQUIPMENT MANUFACTURED BY BUYER, BUYER'S REMEDY FOR BREACH, AS LIMITED HEREIN, SHALL BE LIMITED TO ONE YEAR FROM DATE OF SHIPMENT FROM SELLER.

Heat Exchanger (Condensers) for all Seller's products except non-separated combustion Gas-Fired Unit Heaters and Infrared Heaters, all Burners except Infrared Heaters, and Sheet Metal for all Seller's products

BUYER'S REMEDY FOR BREACH OF WARRANTY, EXCLUSIVE OF ALL OTHER REMEDIES PROVIDED BY LAW, IS LIMITED TO REPAIR OR REPLACEMENT AT THE FACTORY OF SELLER, ANY HEAT EXCHANGER (CONDENSER) OR BURNER WHICH SHALL, WITHIN ONE YEAR FROM DATE OF FIRST BENEFICIAL USE BY BUYER OR ANY OTHER USER, WITHIN ONE YEAR FROM DATE OF RESALE BY BUYER IN ANY UNCHANGED CONDITION, OR WITHIN EIGHTEEN MONTHS FROM DATE OF SHIPMENT FROM SELLER, WHICHEVER OCCURS FIRST, BE RETURNED TO SELLER WITH TRANSPORTATION CHARGES PREPAID AND WHICH THE EXAMINATION OF SELLER SHALL DISCLOSE TO HAVE BEEN DEFECTIVE; EXCEPT THAT WHEN THE PRODUCT IS TO BE USED BY BUYER AS A COMPONENT PART OF EQUIPMENT MANUFACTURED BY BUYER, BUYER'S REMEDY FOR BREACH, AS LIMITED HEREIN, SHALL BE LIMITED TO ONE YEAR FROM DATE OF SHIPMENT FROM SELLER.

Burners

For Seller's Low Intensity Gas-Fired Infrared Heaters

BUYER'S REMEDY FOR BREACH OF WARRANTY, EXCLUSIVE OF ALL OTHER REMEDIES PROVIDED BY LAW, IS LIMITED TO REPAIR OR REPLACEMENT AT THE FACTORY OF SELLER, ANY BURNER WHICH SHALL, WITHIN TWO YEARS FROM DATE OF FIRST BENEFICIAL USE BY BUYER OR ANY OTHER USER, WITHIN TWO YEARS FROM DATE OF RESALE BY BUYER IN ANY UNCHANGED CONDITION, OR WITHIN 30 MONTHS FROM DATE OF SHIPMENT FROM SELLER, WHICHEVER OCCURS FIRST, BE RETURNED TO SELLER WITH TRANSPORTATION CHARGES PREPAID AND WHICH THE EXAMINATION OF SELLER SHALL DISCLOSE TO HAVE BEEN DEFECTIVE; EXCEPT THAT WHEN THE PRODUCT IS TO BE USED BY BUYER AS A COMPONENT PART OF EQUIPMENT MANUFACTURED BY BUYER, BUYER'S REMEDY FOR BREACH, AS LIMITED HEREIN, SHALL BE LIMITED TO ONE YEAR FROM DATE OF SHIPMENT FROM SELLER.

For Seller's High Intensity Gas-Fired Infrared Heaters

BUYER'S REMEDY FOR BREACH OF WARRANTY, EXCLUSIVE OF ALL OTHER REMEDIES PROVIDED BY LAW, IS LIMITED TO REPAIR OR REPLACEMENT AT THE FACTORY OF SELLER, ANY BURNER WHICH SHALL, WITHIN TEN YEARS FROM DATE OF FIRST BENEFICIAL USE BY BUYER OR ANY OTHER USER, WITHIN TEN YEARS FROM DATE OF RESALE BY BUYER IN ANY UNCHANGED CONDITION, OR WITHIN 126 MONTHS FROM DATE OF SHIPMENT FROM SELLER, WHICHEVER OCCURS FIRST, BE RETURNED TO SELLER WITH TRANSPORTATION CHARGES PREPAID AND WHICH THE EXAMINATION OF SELLER SHALL DISCLOSE TO HAVE BEEN DEFECTIVE; EXCEPT THAT WHEN THE PRODUCT IS TO BE USED BY BUYER AS A COMPONENT PART OF EQUIPMENT MANUFACTURED BY BUYER, BUYER'S REMEDY FOR BREACH, AS LIMITED HEREIN, SHALL BE LIMITED TO ONE YEAR FROM DATE OF SHIPMENT FROM SELLER.

All Other Components Excluding Heat Exchanger (Condenser), Burner, and Sheet Metal

For all Seller's products except Direct-Fired Heaters and High Intensity Gas-Fired Infrared Heaters

BUYER'S REMEDY FOR BREACH OF WARRANTY, EXCLUSIVE OF ALL OTHER REMEDIES PROVIDED BY LAW, IS LIMITED TO REPAIR OR REPLACEMENT AT THE FACTORY OF SELLER, ANY PART OR PARTS WHICH SHALL, WITHIN TWO YEARS FROM DATE OF FIRST BENEFICIAL USE BY BUYER OR ANY OTHER USER, WITHIN TWO YEARS FROM DATE OF RESALE BY BUYER IN ANY UNCHANGED CONDITION, OR WITHIN THIRTY MONTHS FROM DATE OF SHIPMENT FROM SELLER, WHICHEVER OCCURS FIRST, BE RETURNED TO SELLER WITH TRANSPORTATION CHARGES PREPAID AND WHICH THE EXAMINATION OF SELLER SHALL DISCLOSE TO HAVE BEEN DEFECTIVE; EXCEPT THAT WHEN THE PRODUCT IS TO BE USED BY BUYER AS A COMPONENT PART OF EQUIPMENT MANUFACTURED BY BUYER, BUYER'S REMEDY FOR BREACH, AS LIMITED HEREIN, SHALL BE LIMITED TO ONE YEAR FROM DATE OF SHIPMENT FROM SELLER.

For Seller's Direct-Fired Heaters and High Intensity Gas-Fired Infrared Heaters

BUYER'S REMEDY FOR BREACH OF WARRANTY EXCLUSIVE OF ALL OTHER REMEDIES PROVIDED BY LAW IS LIMITED TO REPAIR OR REPLACEMENT AT THE SELLER'S OPTION ANY PART OR PARTS WHICH SHALL WITHIN A PERIOD OF ONE YEAR FROM DATE OF FIRST BENEFICIAL USE BY BUYER OR ANY OTHER USER, WITHIN ONE YEAR FROM DATE OF RESALE BY BUYER IN ANY UNCHANGED CONDITION, OR WITHIN 18 MONTHS FROM DATE OF SHIPMENT FROM SELLER, WHICHEVER OCCURS FIRST, BE RETURNED TO SELLER WITH TRANSPORTATION CHARGES PREPAID AND WHICH THE EXAMINATION OF THE SELLER SHALL DISCLOSE TO HAVE BEEN DEFECTIVE.

BUYER AGREES THAT IN NO EVENT WILL SELLER BE LIABLE FOR COSTS OF PROCESSING, LOST PROFITS, INJURY TO GOODWILL, OR ANY OTHER CONSEQUENTIAL OR INCIDENTAL DAMAGES OF ANY KIND RESULTING FROM THE ORDER OR USE OF ITS PRODUCT, WHETHER ARISING FROM BREACH OF WARRANTY, NONCONFORMITY TO ORDERED SPECIFICATIONS, DELAY IN DELIVERY, OR ANY LOSS SUSTAINED BY THE BUYER.

Hamilton Home Products, Inc. has a continuous product improvement program; it reserves the right to change design and specifications without notice.

• FOR RESIDENTIAL USE SEE LIMITED CONSUMER WARRANTY ON PREVIOUS PAGE.

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5H80107

November, 2007

SELECTION AND INSTALLATION INSTRUCTIONS conversion from natural gas to propane gas for model WGH (For direct spark ignition, control code 11)

⚠ WARNING

1. All field gas piping must be pressure/leak tested prior to operation. Never use an open flame. Use a soap solution or equivalent for testing.
2. Gas supply shall be shut-off and the electrical power disconnected before proceeding with the conversion. Failure to do so could result in fire, explosion or electrical shock.

IMPORTANT

1. The use of this manual is specifically intended for a qualified installation and service agency. All installation and service of these kits must be performed by a qualified installation and service agency.
2. These instructions must also be used in conjunction with the Installation and Service manual originally shipped with the appliance being converted, in addition to any other accompanying component supplier literature.

The propane gas kits appearing in this bulletin are for use with units which are going to be installed between 0 and 2,000 ft. elevation. If a unit is to be installed at higher elevations, a special “high altitude” propane orifice kit must be ordered in addition to the propane conversion kits shown here. See Hamilton Bulletin VHHP75-537 for selection of “high altitude” orifice kits.

When converting units to propane at elevations over 2,000 ft., the main burner orifices in the propane conversion kit must be replaced with the orifices from the “high altitude” orifice kit. The remaining components of the propane gas kit, those other than the main burner orifices, are still required to complete the conversion to propane gas, regardless of the elevation at which the unit is installed.

Figure 1.1
Model Number Designations

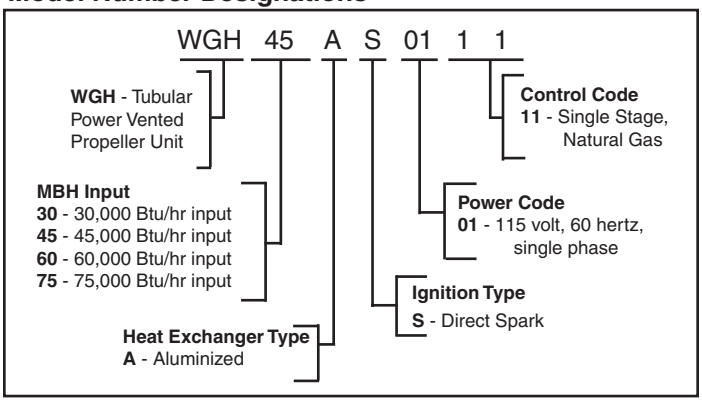
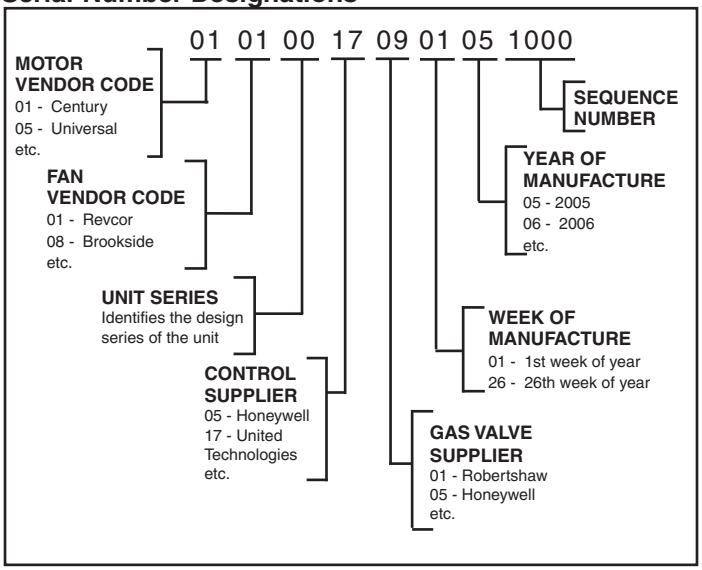

WGH 45 A S 01 1 1
WGH - Tubular Power Vented Propeller Unit
MBH Input
30 - 30,000 Btu/hr input
45 - 45,000 Btu/hr input
60 - 60,000 Btu/hr input
75 - 75,000 Btu/hr input
Heat Exchanger Type
A - Aluminized
Ignition Type
S - Direct Spark
Power Code
01 - 115 volt, 60 hertz, single phase
Control Code
11 - Single Stage, Natural Gas

Figure 1.2
Serial-Number Designations



Identifying the Model, Control Code and Date of Manufacture

Figure 1.1 and 1.2 explains model number and serial number designations. Markings pertinent to verifying correct application of the conversion kit are identified and explained in detail. **The following prerequisites must be satisfied before the unit is deemed convertible:**

1. The first three characters in the model number must be WGH.
2. The control code for the unit must be 11.
3. Finally, the serial number calls out the date the unit was built. Any unit manufactured after the 20th week of 2007, is acceptable for conversion.

THIS MANUAL IS THE PROPERTY OF THE OWNER.
PLEASE BE SURE TO LEAVE IT WITH THE OWNER WHEN YOU LEAVE THE JOB.

Selection of the Proper Kit

Example: Convert a WGH 75AS0111 for use with propane gas.

The appropriate model size is WGH 75 with a Control Code of 11.

Referring to Table 2.1 in the column for the 75 model size, it can be seen that the kit suffix is -1. The full kit number is 3H37267-1. From Table 2.1, the Item Code is 54186.

Table 2.1 - Natural to Propane Conversion Kit for Model WGH, Control Code 11

Kit 3H37267-1	Model Size	30	45	60	75
	Kit Suffix	-1	-1	-1	-1
	Drill Size	56	56	56	56
	Orifices in Kit	5	5	5	5
	Regulator Kit	Yes	Yes	Yes	Yes
	Pressure Switch	No	No	No	No
	Item Code	54186			

Installation of Kit

1. Read these instructions carefully. Failure to follow instructions can damage product or cause a hazardous condition.
2. This conversion kit must be installed by a qualified service person. The qualified service apency performing this work assumes responsibility for the proper conversion of this appliance with this kit.
3. This kit contains the following:
   - Five (5) propane gas orifices
   - A conversion rating plate
   - A combination gas control (gas valve) conversion kit containing:
     – a cap screw
     – an adjustment screw
     – spring
     – label
4. Prior to servicing shut off the gas supply to the unit. Disconnect the electrical power to the unit.
5. Remove the access panel to the heater.
6. Disconnect the gas supply piping to the heater.
7. Remove the electrical connections from the gas valve. This should not require the use of tools.
8. Remove the four (4) screws holding the manifold to the burner box. This will allow for the removal of the manifold and gas valve assembly.
9. Remove the orifices from the manifold assembly and place them where they can be used if the heater should need to be converted back to natural gas.
10. Insert the propane orifices from the kit into the manifold assembly. If you are converting a model size below 75 there will be extra orifices, which should be discarded. Tighten the orifices using a wrench so that they are gas tight.
11. Convert the combination gas valve by following the manufacturer's instructions in the regulator kit.
12. Affix the Propane Rating Plate label that came with the kit on the heater, near the serial plate on the same panel as the common replacement parts label.
13. Place the manifold assembly back on the burner box using the four (4) screws.
14. Replace the electrical connections to the gas valve.
15. Verify that the igniter and sensor are in the same location and have not been damaged.
16. Connect the gas supply piping to the heater using two wrenches so as to not place strain on the manifold, which can cause misalignment of the gas orifices.

Check

1. See the original rating plate for the unit heater's rated input and verify by checking the correct main burner orifice size and manifold pressure. This information is presented on the conversion kit rating plate and in Table 2.1.
2. Remove the inlet and outlet pressure tap plugs and place pressure taps on both the inlet and outlet pressure tap of the gas valve.
3. Connect a pressure-measuring device capable of reading inches of water column on both the inlet and outlet pressure tap.
4. Place the unit in operation. Verify the proper ignition sequence. The inlet pressure should be 11" - 14" water column. The manifold pressure should be 10" water column.
5. There are no adjustments that can be made to the burner flame. Some yellow in the flame is acceptable as long as no carbon (black soot) is being formed.
6. Turn the heater off and replace the inlet and outlet pressure tap plugs.
7. Place the heater back into service and leak test the inlet and outlet pressure tap plugs as well as the connection between the gas valve and the manifold pipe and supply piping to the valve.

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LED DIAGNOSTIC CODES

Please Note: *Determine the manufacturer of the control on your unit and use the appropriate code chart.*

UNITED TECHNOLOGIES	
Green Light	
Steady ON	Normal Operation, no call for heat
Fast Flash	Normal Operation, call for heat
1 Flash	Pressure switch open, inducer ON
2 Flashes	Pressure switch closed, inducer OFF
3 Flashes	Limit switch is open
4 Flashes	Ignition lockout
6 Flashes	Too many limit switch losses
7 Flashes	Too many flame losses
Amber Light	
Steady ON	Flame is sensed
Fast Flash	Flame present with gas valve OFF

HONEYWELL	
Green Light	
Short Flash	IDLE: no call for heat
Heartbeat	Call for heat
2 Flashes	Pressure switch failed open
3 Flashes	Pressure switch failed open
4 Flashes	Limit open
5 Flashes	Flame out of sequence, flame present
6+1 Flash	Soft Lockout: Failed to light - 4 Trials
Amber Light	
Seady ON	Flame is sensed
OFF	Flame signal below flame lost level

See control literature for more detailed codes

5H0799970001